ELECTRICAL REVIEW

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24th September, 1948

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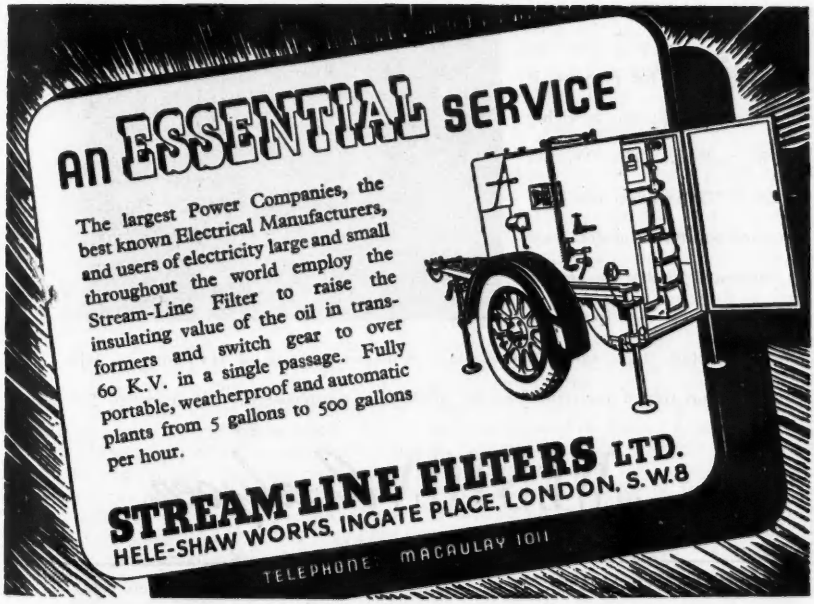
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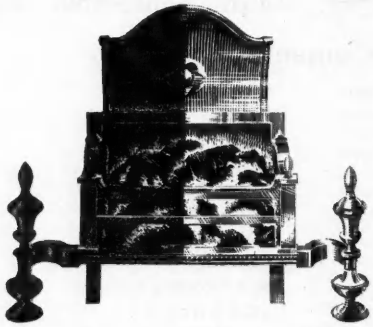

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ELECTRICAL REVIEW

THE OLDEST ELECTRICAL PAPER — ESTABLISHED 1872

Vol. CXLIII. No. 3696 24th SEPTEMBER, 1948 9d. WEEKLY

Emergency Generation

MEETING PEAKS WITH GAS TURBINES

ATTENTION was drawn in our Correspondence section last week to the reference in the Clow Committee's Report (reviewed by us on 2nd August) to the use of gas turbines for carrying seasonal peaks. The provision of generating plant is the only real solution of present difficulties. Peak loads under grid operation have hitherto been carried by the older steam units. As outstanding capital charges on these had to be paid, and the cost of fuel for short-period running at prices per ton then obtaining was not great, this was an economical and convenient method. Base loads were carried by new and more efficient plant which was continually installed to cope with the growing electrical demand.

Under present conditions, which are likely to remain for some years ahead as a result of the slowing down of the installation of new plant, generating sets approaching obsolescence have to deal to a greater extent with daytime base loads.

Expensive Steam Stand-by Plant

Changes in the shape of the daily and annual load curves and increase in load factor in recent years have resulted in a spreading out of the "peaks" over several hours of the day, on top of which there are periodic short peaks which now too often have simply to be shed. Such of the old plant as would normally be used only in emergency becomes increasingly expensive to maintain and operate for its more onerous duties and cannot always be put on load quickly. The "spinning reserve," presented by the difference between maximum and economic ratings in some cases, is already absorbed in dealing with ordinary winter loads.

How far are these and other disadvantages outweighed by the omission of capital charges from the equation? Conversely, to what extent do the merits of gas turbines justify a departure from the practice of not incurring capital expenditure on plant for peaks and emergencies? Certain advantages of gas turbines on paper are obvious. They can be built relatively quickly and require appreciably less space and civil engineering work and water supplies; they can be run up from cold and put on load in a few minutes and require less attendance.

Cost Considerations

The comparison of capital costs for steam and gas turbine plants given in this issue is at first sight somewhat disappointing. They apply, however, to the peculiar operating conditions of Switzerland, and the amount that should be included for development charges in experimental work of this kind is always uncertain. These considerations apply also to the estimated overall costs for Beznau power station, which do nevertheless give a guide to the performance that can be expected elsewhere. One point is whether maintenance is so independent of plant load factor that it can be taken as a percentage of the capital expenditure.

A further advantage of the gas turbine is that its components and circuits can be varied to give the most economic results in any given circumstances. Allowing for

the difference in British conditions, there appear to be good grounds for the view expressed by Mr. H. G. Bell and Dr. D. M. Smith in their I.M.E.A. paper (see our issue of 11th June) that load factors of 16 to 18 per cent at present offer the most promising economic range. Any considerable use here will probably await the attainment of greater thermal efficiencies brought about by higher temperatures due to advances in metallurgy and to the adaptation of design to the burning of coal. There can be no doubt, however, as to the value of the experience to be gained from Beznau and from Trafford and Dunston in the near future.

D.C. TRANSMISSION

THE E.R.A. Reports referred to in this issue are valuable not only for the factual information they contain about technical advances in Germany during the war but also for Dr. Busemann's constructive criticism of the various aspects of d.c. transmission and his survey of the problems awaiting solution in both a.c. and d.c. development. In devoting attention to d.c., which is not immediately practicable, instead of going ahead with a.c. improvements, the electrical manufacturers and supply undertaking engineers in Germany were over-ridden by Government Departments. A main reason was the mistaken official opinion that overhead lines would suffer more than underground cables from air attack—an opinion contrary to that expressed by us in 1939.

USING WASTE HEAT

NOT enough has been done to make use of industrial waste heat in the forty years or more since blast-furnace and coke-oven gases were first used in Durham for public electricity supply. In addition to the losses incurred by private plants in sending into the atmosphere heat that is in excess of their individual requirements, there is waste of money in underloaded and stand-by generating units and in large reserve fuel stocks. The examples of heat and power linkage given in a new Fuel Efficiency Bulletin, No. 51, of the Ministry of Fuel and Power, illustrates the benefits obtainable through such co-operation. The public supply system is usually best able to make the fullest use of diversity and the subject is worth close investigation by the British Electricity Authority.

SAFETY ON ROADS

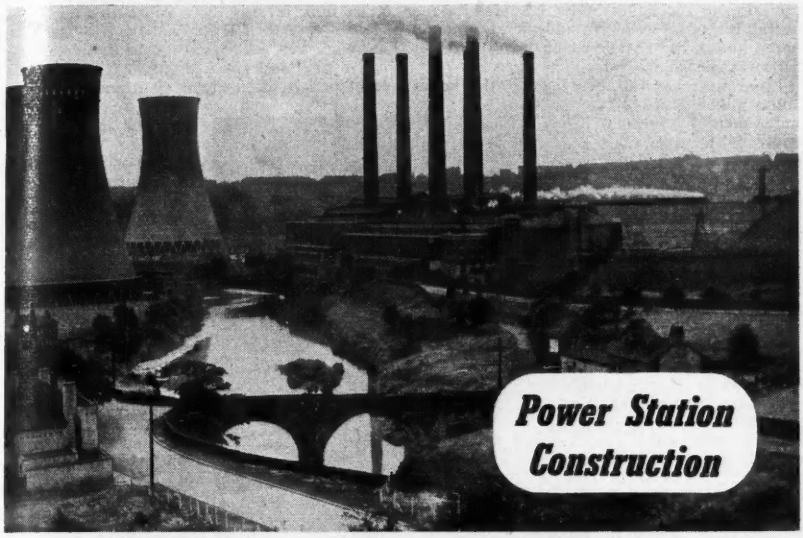
THE safety aspect of street lighting was well to the fore in every session of last week's conference of the Association of Public Lighting Engineers. On the basis of traffic conditions in 1945 accidents on the road cost £100 million a year. As about a third of accidents occur after dark, lighting can be held as a contributory factor in over £30 million worth of damage. Since only £3·5 million is the estimated figure of the annual cost of lighting all classified roads in the county boroughs and 20 per cent of those in counties to the standard recommended, it would certainly seem that additional expenditure on illuminating our streets should prove a profitable investment. It is, of course, true that electric power shortage militates against extensive public lighting schemes at present, but these form what is after all largely an off-peak load.

IMPROVED POSITION

WHEN Sir Stafford Cripps is optimistic (however guardedly), as he was last week, it can be taken that the country's economy is definitely better. The Chancellor announced that exports in the first half of this year were £26 million above the predicted figure. This has been offset by an unexpected rise of £95 in imports, mainly because of higher prices, but there are signs of relief in this direction. The total deficit, after taking "invisible" exports into account was less than half the rate of 1947. Exports as a whole were 140 per cent of the pre-war volume and, we may add, the electrical industry has contributed much to this result.

"CONSUMER" APPLIANCES

AT a conference to be held at Scarborough this week-end the National Chamber of Trade is to discuss a resolution urging manufacturers' associations not to supply "consumer" goods to the new gas and electricity authorities. The idea is to protect the private dealer in this equipment, but however laudable it may seem to be it is an ill-considered move. Manufacturers are already apprehensive of the manufacturing powers bestowed by both the Gas and Electricity Bills and there seems to be no better way of compelling the new boards to exercise these powers than the imposition of a boycott.



Power Station Construction

A Major Extension

OUR post-war policy in describing new power stations in this country has been to deal with them first during erection, to portray the constructional lay-out, and then after commissioning to emphasize the operational aspects. For the first time, however, we are now describing a power station extension in the constructional stage, namely, that at Kearsley in the North Western Division of the British Electricity Authority. Many future extensions may demand similar treatment, but for the time being the Kearsley extension may be regarded as an exception, partly because of its size (100,000 kW) and also because it has some outstanding technical features, notably the spreader system of boiler firing, and the carrying out of the alternator winding on site.

With this extension the generating-plant capacity is brought up to 271,700 kW, and the boiler-plant capacity up to 3,424,000 lb per hr. The major plant extensions consist of two 52,000-kW B.T.H. turbo-alternators and eight 160,000-lb per hr B. & W. boilers. The designed steam conditions are 620 lb per sq in. and 820 deg F; the generating voltage is 33 kV.

The station is situated in the Irwell valley 6½ miles due north-west of the centre of Manchester. It is mainly on the west bank of the river, with the original cooling towers situated on the opposite bank, and on the north-east side of and adjacent to the Manchester-Bolton railway line, about half a mile from Kearsley railway station. The power station site of 95·4 acres is roughly a triangle with north, south and west apexes. Practically the railway is the north-west to south-east boundary of the site. The main buildings run due north and south and parallel with the winding river at this particular point. In the south corner are two new cooling towers, each 298 ft high and having base, waist and top diameters of 212 ft, 106 ft and 119 ft, respectively, on the same bank of the river as the main buildings, but at this point the river presents a N.W.-S.E. front. Between the new cooling towers and the river is the grid substation.

The main buildings seen in our title photograph run north-south parallel with the river at this point; extensions at south end

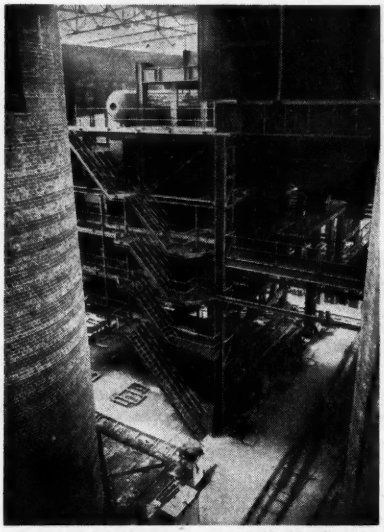
Immediately off the north end of the buildings is the coal-storage ground, and north of this, i.e., in the north corner of the site triangle, is the ash dump, which is now being removed. Extensive railway sidings serve the buildings and coal and ash stores, and in particular the new tippler plant off the west side of the buildings, which is the first part of new coal-handling plant, including twin inclined belt conveyors up to the conveyor house over the coal bunkers.

The extensions are being made at the south end of the main buildings where there were temporary ends to the boiler and turbine houses and the station is now regarded as having attained its ultimate capacity. The extensions to the buildings are now practically complete, and like the rest of the buildings they are of steel-girder construction with brick filling. The 280-ft long

extension to the boiler house has brought the overall length up to 780 ft, and the turbine and pump houses are now lined up with the boiler house at the south end.

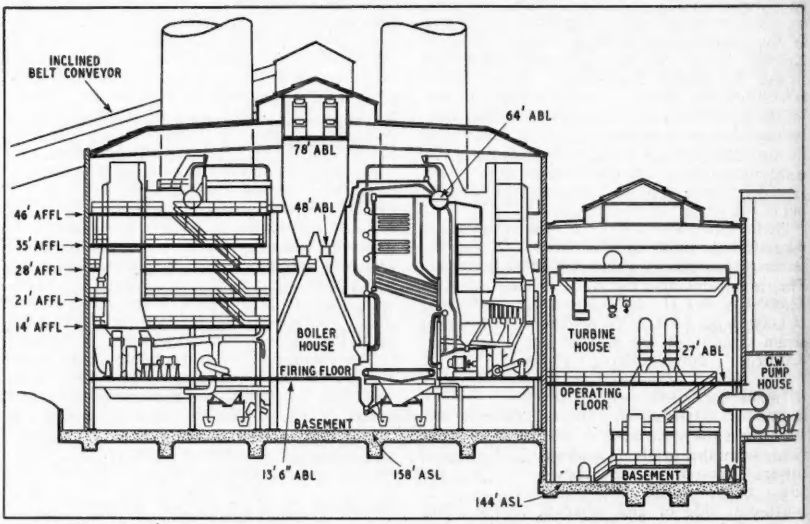
From west to east there is first the boiler house which is 124 ft wide, then the turbine house 53 ft wide, and then the condensing water pump house with a width of 33 ft, giving an overall width at the south end of 210 ft. But the new pump house, which will accommodate four 25,500 g.p.m. pumps—two per set—and is about 155 ft long, abuts end-on at its north end the new switch house which is 53 ft wide and adjoins the turbine house, thus giving an overall width to the buildings at this part of 230 ft. Adding to this the 17 ft width of the transformer bay which flanks the east side of the switch house the maximum overall width of the buildings is 247 ft.

The boiler-house basement level is 158 ft above sea level, and the firing floor level is 13 ft 6 in above this. The normal roof level is 81 ft above the basement, although centrally over the coal bunkers the conveyor house rises above this level. The eight boilers, each about 40 ft wide and 44 ft front to back, are arranged in two facing lines on either side of a 24-ft firing aisle at 60-ft centres, except that midway on each side is one of the pair of new chimneys necessitating in these two cases 100-ft centres. The boilers rise to an overall height of 66 ft, and the top and bottom (outlet) levels of the bunkers are 78 ft and 48 ft, respectively, all above basement level. The chimneys, of brick construction, are 325 ft high and have base and top external diameters of 29 ft and 17 ft, respectively.

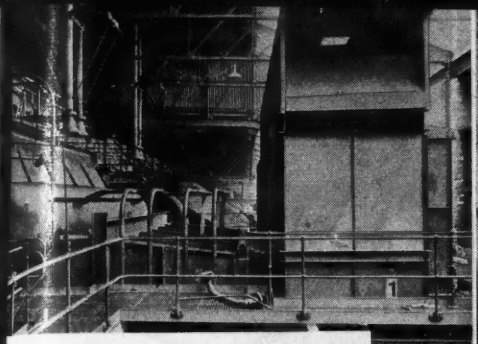


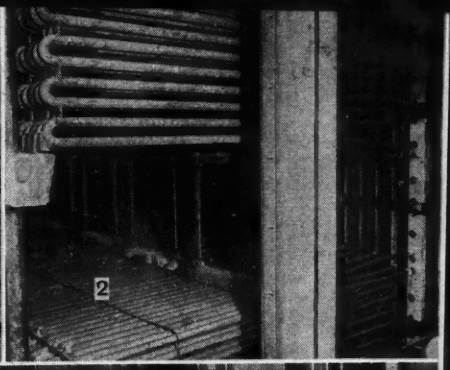
There are gallery levels at 14, 21, 28, 35 and 46 ft above the firing floor

Each boiler is of the single-drum high-head type, the drum being situated over the rear wall of the combustion chamber at a centre-line level of 64 ft above basement level. About the complete plant, i.e.,

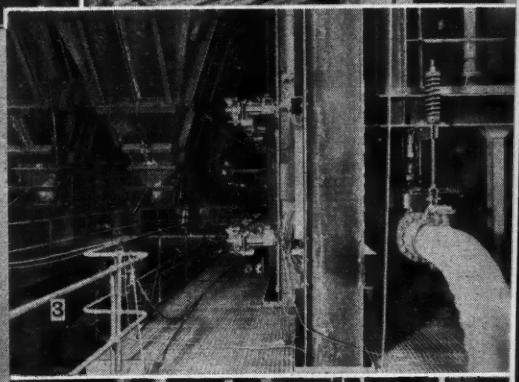


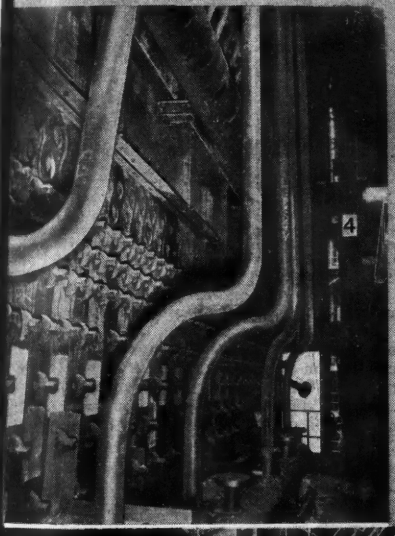
There is considerable difference in basement, operating- and firing-floor, and roof levels

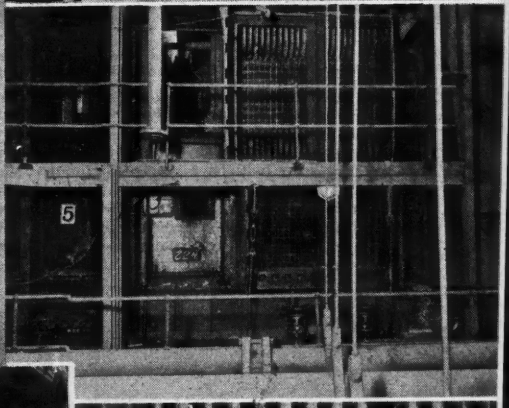


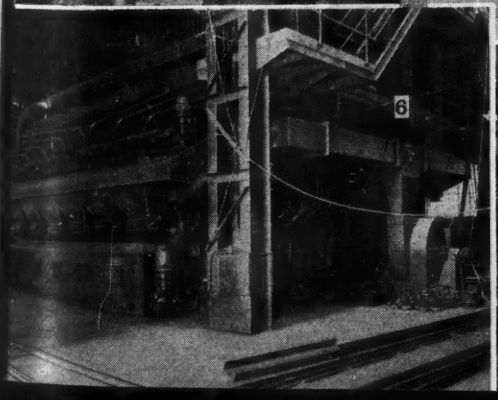


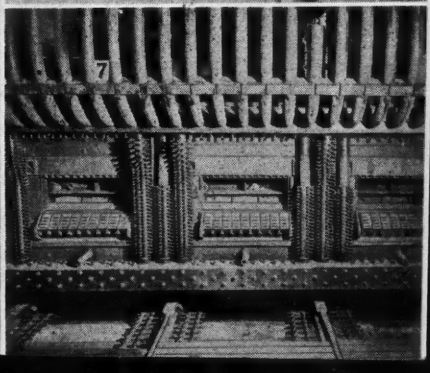
(1) Fifth level—drum left, economizer centre, air heater right. (2) Superheater sections at fourth level. (3) At the third level near the bunker bottoms; stop valve right, soot-blowers centre. (4) Second level, tube headers at front; top, superheater outlet box; bottom, wall-cooling water-tube top-front box. (5) Second level—the economizer rests between the boiler back and air heater right. (6) Firing floor level—six hoppers serve spreader feeders. (7) Inside combustion chamber looking forward; secondary-air inlet below each fuel inlet

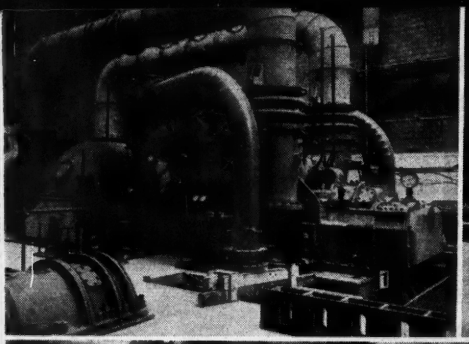


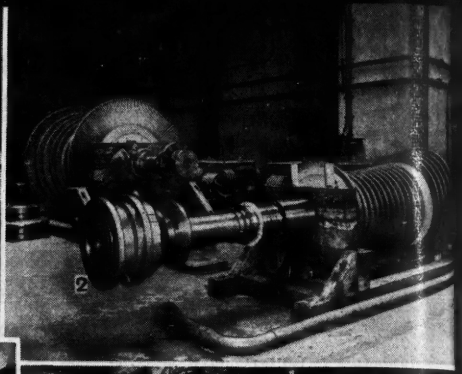


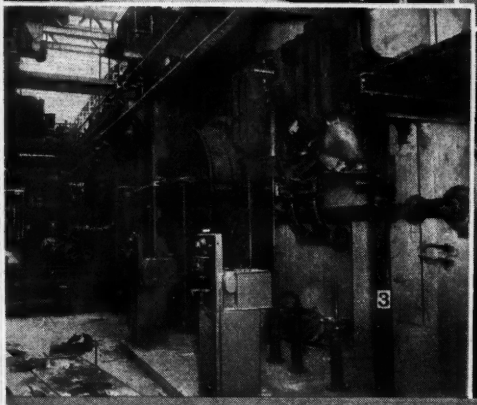


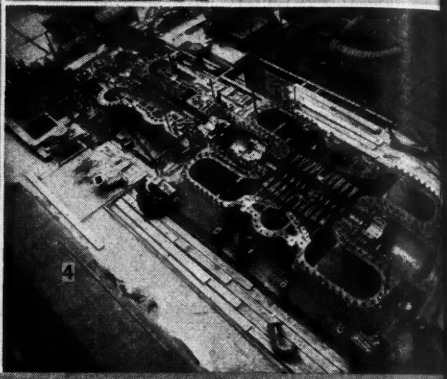








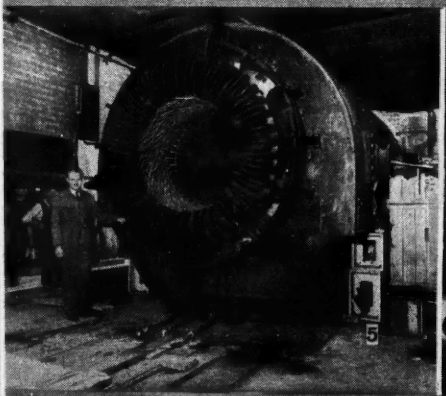


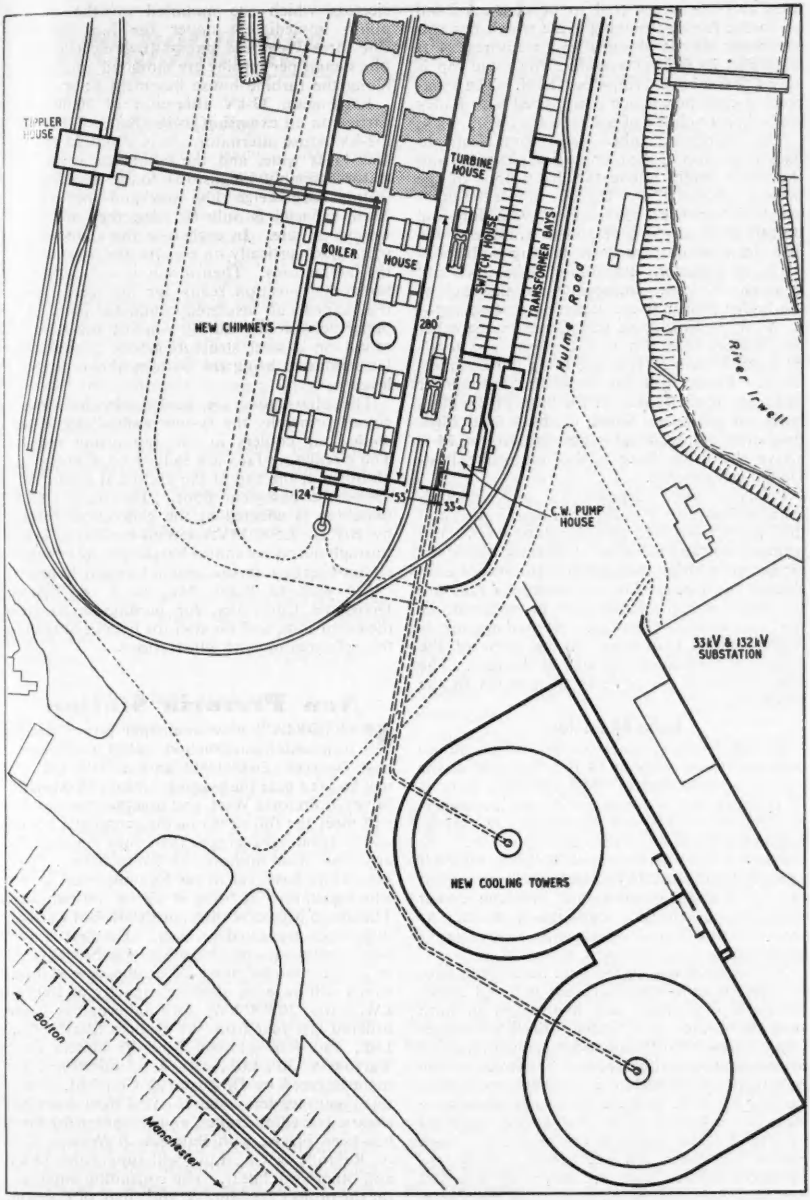


TURBINE GROUP—(1) One turbine proper is complete and the bottom casings of the other one (4) is ready to receive the h.p. and l.p. rotors (2). (3) Steam-operated air ejectors are mounted on the turbine plinth beside the condenser; the feed-water pumps are aligned in the turbine-house basement. **ALTERNATOR GROUP** (see below)—(5) One site-wound alternator stator is being prepared for its pressure tests; in the other (6) a bar is being adjusted after assembly

boiler, economizer, air heater, and so on, is a system of galleries with five levels of about 14, 21, 28, 35 and 46 ft, all above the firing-floor level. The complete system of galleries is suspended from the upper girder structure.

The boiler is fired by the Babcock-Detroit spreader type stoker which provides for the consumption of some of the fines during suspension in the combustion chamber. The coal is chute-fed from the bunker to six hoppers along the combustion-chamber front, each serving a rotary paddle feeder in the chamber front wall. The paddles " throw " the coal to the back of the combustion chamber, and the ash from the





The 95-acre site is roughly triangular and the main buildings run due north and south

fines and the larger coal to be consumed fall on to the forward-moving grate which has two separately driven sections and measures 24 ft wide and 16 ft long overall. The grate top is about 3 ft above firing-floor level. The combustion chamber, which is equipped with Bailey walls, has a volume of 6,850 cu ft.

The generating tubes slope from front to back at the top of the combustion chamber, and the mean height above the firing floor of the bottom tubes is 22 ft. Directly above the tubes are two banks of superheaters with top and bottom levels of about 58 and 46 ft, respectively. The drum at the top is 30 ft long and about 54 in. in diameter. Its wall is 2⅞ in. thick and it weighs 29 tons. Immediately at the back of the boiler proper is the steaming economizer—B. & W. in four cases and Green in the other four—which has top and bottom tube levels of about 53 and 33 ft above firing floor, respectively. From back to front the economizer measures about 12 ft. At the back of the plant is the air pre-heater which is about 80 ft high. Below the air heater at a bottom level of 14 ft above the firing floor is the multi-tube Prat-Daniel grit arrestor.

Primary- and secondary-air and induced-draught fans, two of each, serve each boiler, and they are all installed at firing-floor level. The primary-air fans are aligned directly under the air heater, with an induced draught unit at each side of the plant. The secondary-air fans are situated roughly centrally one at each side of the combustion chamber. Secondary air is introduced at two levels at the front of the combustion chamber and one at the rear. The ash spill from the grate is to hoppers in the basement.

Turbo-Alternators

At 144 ft above sea level the turbine-house basement floor is about 14 ft below that of the boiler-house basement. The operating-floor is 27 ft above the basement floor, and the highest roof point is 81 ft above basement. The crane-rail level is 23 ft above the operating floor. The two new turbo-alternators, each measuring 20 ft wide, 91 ft long and 44 ft high from the basement floor, are aligned end-to-end with the earlier machines, the electrical ends facing north. At the operating-floor level there is a spacing of 68 ft between the two new machines.

The turbines are 3,000-r.p.m. horizontal, two-cylinder, double-flow machines with 18 stages in the h.p. cylinder and five stages in both sections of the l.p. cylinder. Each discharges into a pair of Worthington-Simpson condensers nested in the turbine concrete plinths in the basement. Each turbine is bled at three stages, and the h.p., i.p. and l.p. feed-water heaters are mounted vertically a few feet above basement floor level at the steam end of the turbine. Each pair of condensers has a combined cooling area of 50,000 sq ft. They are served by two 100 per cent duty extraction pumps at basement-floor level and two sets of steam-operated air ejectors which are mounted on the turbine plinth immediately under the h.p. cylinder. The three Weir feed pumps (two electrical and one steam) per turbine are mounted and aligned along the turbine house basement floor.

Each main 33-kV alternator of 50,000 kW carries on an extension to its shaft, a 2,000-kW, 3·3-kV house alternator. It is about 22 ft long and 11 ft wide, and the combined rotor and stator assembly weighs 164 tons. Because the stators each weigh 130 tons and the existing crane capacity is only 80 tons, they are being wound on site. In each case the stator frame was stood vertically on end for the assembly of the laminations. Then it was lowered into the horizontal position ready for the reception of the shaped and insulated conductor bars. For better accessibility during winding the stator is raised on a steel structure about a couple of feet, so as to bring the bottom above bedplate level.

The alternators are cooled on the closed-circuit principle, the system embodying water-cooled air coolers in the supporting plinths. The circulating fans are lodged on a projecting platform at the end of the plinths at about 20 ft above the basement floor. The main station switching is effected at the generation voltage by B.T.H. 1,500-MVA circuit-breakers linked through the power source bars to the distribution circuit-breakers in the original switch house.

We wish to thank Mr. C. T. S. Arnett, Divisional Controller, for permission to view the extensions, and his staff for help in obtaining the information and illustrations.

New Pretoria Station

PRETORIA'S new municipal power station now under construction will, it is estimated, cost between £6,000,000 and £7,000,000. It will be sited near the existing station, off Mitchell Street in Pretoria West, and together the stations will meet the full needs of the municipal region and a rural area bigger than that supplied by any other local authority in South Africa. Two generators have yet to be commissioned at the existing station to bring it up to full capacity. They have been on order since 1941, but wartime difficulties prevented delivery. The first is now being installed, and the other will be delivered in a few months' time. For the new station, which will have an ultimate capacity of 180,000 kW, two 30,000-kW turbo-alternators were ordered last year from the English Electric Co., Ltd., and four 210,000-lb-per-hr boilers from Yarrow & Co., Ltd., with dust collecting plant manufactured by Davidson & Co., Ltd. Early this year tenders were invited for overhead electric travelling cranes, and the order for these has been placed with Babcock & Wilcox, Ltd. A. Reyrolle & Co., Ltd., will supply the 33-kV and other switchgear. The consulting engineers for the project are Merz & McLellan, of London, and Kanthack & Partners, of Johannesburg.

Correspondence

Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for the opinions expressed by correspondents.

Grain Drying

In his article in your issue of 10th September, Mr. E. C. Claydon describes a new type of grain drying installation at Leighton Buzzard. I should like to draw attention to the considerable advantages of asbestos woven heating nets for this and similar types of installation.

These possess very high efficiency because almost the whole of the heating wire surface is exposed directly to the air flow. A relatively great length of heavy gauge heating wire can be employed giving a large surface area and resulting in a low temperature wire with indefinite life.

They also have sufficient mechanical strength to withstand rough handling, cleaning, etc., they can readily be manufactured in almost any size and shape to fit any size of duct; they can be easily mounted in the duct; and are cheap.

I have recently seen such heaters very successfully employed in grain dryers, film drying cabinets, spiral film dryers, space heaters, etc.

Harrow. H. G. POXON.

Electrical Accidents

WITH reference to the leading article in your issue of 3rd September, the handling of potentially dangerous equipment on power supply systems does not appear to have received the same attention as in factories and domestic installations and the same methods would not apply. Mechanical interlocking does not eliminate danger because of the personal factor, as when one of a pair of lines or transformers has been made dead and supposedly safe for working on. Mechanical interlocking will not prevent a linesman from climbing up on the wrong side of a double-circuit line for instance.

Notices are not infallible safeguards; they may be misread or perhaps placed on the wrong apparatus or plastered about so thickly that the habit of ignoring them is acquired. Workmen who have become used to seeing the warning " Danger : men working on the line " hanging on a fire bucket for months ready awaiting use are unlikely to pay much attention to it when it is hung on a switch. Danger notices are useful only when they are visible for short periods. Fewer notices, less often displayed, of varying types of size and colour, would have far more effect in arresting the attention for the split second in which action is taken that can result in a fatality.

A permit-to-work card should be more than a means of fixing responsibility for an accident. It must prevent the accident. The chief cause of accidents in this class is pride, since no one will admit that he is not clear as to what is dead and to what is alive.

A method of which I have had experience and which has been completely successful in use for more than 20 years, is based on the principle of communal responsibility for the safety of a working group, from the engineer in charge of the job to the labourer. Everyone in a group engaged on potentially dangerous work is allowed to doubt or deny the safety of the precautions taken, whatever his status. To make this scheme practicable, talks must be given to the men at infrequent, but soundly gauged, intervals. The best time is after an electrical accident, which has come to the attention of the staff, or which has been widely published in the papers. Slogans, including even comic ones, are useful to point out the dangers and establish an awareness that lessens chances of accident.

Leamington Spa. K. FOWKES, A.M.I.E.E.

Mixed Export Groups

QUITE recently, the Export Promotion Department of the Board of Trade, through its regional export officers, has started to encourage the formation of " mixed export groups " representing from four to eight, or even ten, smaller manufacturers who produce non-competitive articles.

Each manufacturer for himself might not have the time, staff, knowledge or experience in export trading. He might not be able either to spend a lot of money to build up his export trade or to pay dearly for the usual experiences which most newcomers encounter. But if he joins forces with some other manufacturers in the same position he will save a lot of his own time, not overburden his own staff, save most of the expenses the venture would cost him; and he can then benefit from the knowledge and the experience of a first-class export manager whom he alone could not afford to pay.

The many advantages of such a scheme can be recognized at first glance:—

(1) The expenses of the group export office are shared so that one manufacturer has only to pay one-eighth or one-tenth of the expenses.

(2) The group as a whole is more powerful than one individual smaller manufacturer and will command more attention in the world's markets and thus will be able to interest better and larger import agencies. The influence the manufacturer in his capacity as group member can exercise on his agency abroad will develop into a big advantage too. The agency very soon realises the strong connection between group members and does not want to disappoint any one of them for fear of general consequences. Experience has proved that most agencies will do their utmost to satisfy every member, even those with lines more difficult to deal with.

(3) By grouping the shipments of the various members for one destination in " collective " transports, many expenses will be saved and small shipments by single members will go to their destinations at the same cheap freight rate as big consignments. This will enable the import agent abroad to test his market first, by starting to buy small quantities from each manufacturer in the group, without having to put up with high " minimum freight " rates and the large risks when buying large quantities from the outset of articles new to his market.

About two years ago, twelve Northern manufacturers (under my guidance), formed such a group. They manufacture allied but non-competitive goods, and each employs from 80 to 100 workers. They have built up a substantial and regular export trade to about thirty countries.

I shall be glad to give further information regarding the scheme to any interested readers.

H. CATLEEN, D.SC., M.I.EX.

Banstead, Surrey.

Domestic Demand

IN page 399 of your issue of 10th September, Mr. Bowen comments on my previous letter (p. 355 of 3rd September issue), but puts many words into my mouth which have no right there. I wished only to raise the issue of the supreme hardship of the all-electric household when the supply is cut off. There is no remotely comparable condition appertaining elsewhere and no one seems to wish to help such people. It is also my opinion that Mr. Bowen's suggestions for control are impracticable and I said so.

The electrical industry, taken as a whole, created those five million peak-load space heaters and it is that same industry that now makes its true supporters—the all-electric householders—suffer so sharply for it and I think it is very hard that it should be so. I repeat my plea for a modicum of thought and help for all-electric households and I do not wish to be drawn into argument about the entirely different matters contained in Mr. Bowen's letter.

Bromley, Kent. R. WHEATLEY MINTER.

ALL supply engineers within recent years have felt rather depressed at the restrictions which it has been necessary to impose on consumers, upsetting preconceived ideas of " electricity for all," but nobody even in their most fearsome nightmares, has ever imagined such a state of chaos as Mr. Bowden would like to inflict on the poor consumer and the equally unfortunate engineers running round in circles replacing blown fuses night and day.

While it is agreed that it may be necessary for a time to restrict extra connections and induce consumers, by preferential tariffs, to have some portion of their load controlled by ripple equipment, for Heaven's sake let us keep a sense of perspective, and try to remember that we are here to provide a service.

It often occurs to one that if half of the people at present employed in imposing restrictions on the community as a whole, were suddenly switched to productive effort, a lot of our problems might find themselves solved.

W. K. ALLEN,

Jersey. M.ENG., A.M.I.E.E., A.M.I.MECH.E.

N.E.S.C.O.E. Association

THE eleventh annual dinner of the N.E.S.C.O.E. Association will be held at the Waldorf Hotel, London, on Thursday, 28th October, at 7.30 p.m. Sir Arnold Gridley, K.B.E., M.P., will be in the chair and Lt. Col. E. H. E. Woodward, M.C., will be guest of honour. The dinner will be preceded by the annual general meeting at 7 p.m. All who were on the staff of the North-Eastern Electric Supply Co. before vesting day are eligible for membership and will be welcome at the dinner. Particulars of membership may be obtained from Mr. W. G. Bass, hon. secretary, N.E.S.C.O.E. Association, Fifth Floor, Kern House, 36, Kingsway, W.C.2.

Institution Centres

FURTHER BIOGRAPHIES OF NEW CHAIRMEN

THE chairman of the *Mersey and North Wales Centre* of the Institution of Electrical Engineers for the 1948-49 session, **Mr. T. B. D. Terroni**, B.SC.(HONS.), A.C.G.I., D.I.C., received his engineering training at the City and Guilds Engineering College, where he completed a post-graduate course in heavy electrical engineering. After a further year as demonstrator he spent a year as junior transformer designer with Ferranti, Ltd. He then went over to telecommunications work with the International Telephone & Telegraph Laboratories, Inc., for about three years, and in 1931 joined the Automatic Telephone & Electric Co., with whom he now holds the position of assistant chief engineer, transmission systems. Mr. Terroni is forty-four years of age.

Mr. T. B. D. Terroni

Mr. R. P. Horlock

Mr. W. Hill (*Western Centre*) was educated at Harrow and received his early technical training at the Royal School of Mines in London. His studies were interrupted by the 1914-18 war when he served in the London Electrical Engineers and attained the rank of captain. After a period as junior engineer with the Hereford Corporation, dealing with rural development, he joined the West Gloucestershire Power Co., Ltd., in its early days when it was known as the Norchard Syndicate. He held the position of chief engineering assistant until January, 1947, when he became chief engineer, and he is now sub-area engineer in the Central Gloucestershire Sub-Area of the Midlands Electricity Board.

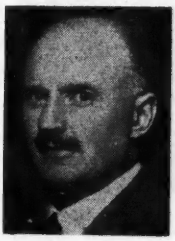
Mr. W. Hill

Mr. R. P. Horlock, B.SC.(ENG.), A.C.G.I. (*North Midland Centre*) is manager of the Sheffield district office of the Metropolitan-Vickers Electrical Co., Ltd., with sub-offices at Nottingham, Leeds and Hull. He obtained an honours degree at the Imperial College of Science and Technology, City and Guilds (Eng.) College, in 1928 and entered the Metropolitan-Vickers organization as a college apprentice. After completing his course he was appointed to the staff of the rolling mill section of the Plant Engineering Department. (In 1933 he was awarded an I.E.E. Student Premium for a paper on "The Application of Electric Drive to Rolling Mills.") After a short spell in the London office of the company he returned to Trafford Park in 1934 for further work on rolling mills, large electrical plant and manufacturers' committees. He was appointed manager of the company's sub-office at Leeds in 1941, and became manager at Sheffield in 1947.

Major J. E. Jones, B.SC. (*Northern Ireland*) was trained in the workshops of the Automatic Telephone Co., Liverpool, from 1911 to 1914 and served in the Royal Engineers through both wars. He took the B.Sc. electrical degree at Belfast in 1923 and from then until 1932 he was in the distribution department of the Belfast Corporation. Subsequently until the outbreak of war he served as area manager of the Electricity Board for Northern Ireland and since demobilization has been employed as sales engineer to the Board. He is at present chairman of the Northern Ireland Section of the E.P.E.A. for the third time.

Mr. James Gogan, M.I.E.E., M.S.M.A. (*Scottish Centre*), who was recently appointed chief commercial officer to the South West Scotland Electricity Board, is an old "Clyde Valley" man. From 1933 until vesting date, he was development superintendent and sales manager to the Clyde Valley Electrical Power Co. at Glasgow. Although primarily preoccupied with heavy industrial problems, Mr. Gogan has always taken a keen interest in domestic appliances, and has at least one patent to his

Major J. E. Jones



Mr. J. Gogan

credit in connection with cooker hot-plates. From 1928-1933 he was "lent" to the C.E.B., to take charge of the change-over from 25 to 50 cycles throughout the Clyde Valley area of some 1,200 sq miles. This change-over, involving some 55,000 consumers, was the first to be tackled under the 1926 Act and was completed over a year ahead of schedule, although some very large and complicated installations, such as steel rolling mills, were involved.

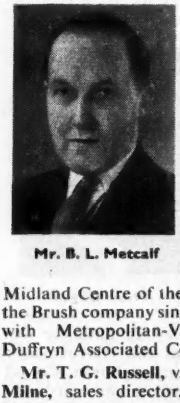
Born and educated in Dublin, where he received his technical and early practical training, Mr. Gogan went to Scotland to join the Paisley Tramways as district engineer. Shortly afterwards, in 1915, he joined the Clyde Valley Co. and after gaining generation experience in the company's power stations, he went over to the distribution side. During the 1914-18 war he served in the Royal Navy and was for some time in the electrical department of H.M.S. *Vernon*, the Torpedo and Mining School at Portsmouth.

PERSONAL and SOCIAL

News of Men and Women of the Industry

IT is announced that **Mr. F. Geoffrey Marshall,** A.M.I.E.E., has been appointed electrical engineer to the newly-constituted Ulster Transport Authority which comes into existence on 1st October. The new Authority will consist initially of the former Northern Ireland Road Transport Board and the Belfast and County Down Railway with the Northern Counties Railway (former L.M.S.) coming in at an early date. Mr. Marshall was apprenticed to the Horwich works of the L.M.S. Railway and joined Siemens Bros. & Co., Ltd., Woolwich, in 1927 as an outside contracts cable engineer. In 1934 he joined the L.M.S. in the chief mechanical engineer's department at Euston and four years later was appointed to his present position of electrical, signal and telegraph engineer to the Northern Counties Committee (L.M.S. Railway) at Belfast.

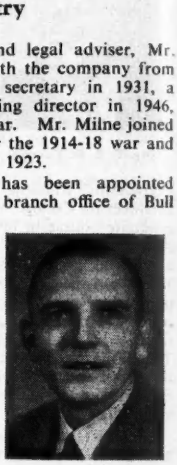
Mr. B. L. Metcalf, technical director of the Brush Electrical Engineering Co., Ltd., has been appointed chief mechanical and electrical engineer in the Production Department of the National Coal Board. He will take up his new duties on 1st December but will continue to be available to the Brush company for consultation as a director. Some details of Mr. Metcalf's career were published in the *Electrical Review* of 3rd September, when we were dealing with him as chairman of the East Midland Centre of the I.E.E. He has been with the Brush company since 1945 and was previously with Metropolitan-Vickers and the Powell Duffryn Associated Collieries.



Mr. B. L. Metcalf

Mr. T. G. Russell, vice-chairman, and **Mr. W. Milne,** sales director, of the British Driver-Harris Co., Ltd., are retiring from the board of the company at the end of September, but their services are being retained in a consultative capacity. As solicitor and legal adviser, Mr. Russell was connected with the company from its formation, becoming secretary in 1931, a director in 1945, managing director in 1946, and vice-chairman last year. Mr. Milne joined the company shortly after the 1914-18 war and became sales manager in 1923.

Mr. F. J. Halliday has been appointed manager of the Midland branch office of Bull Motors (E. R. & F. Turner, Ltd), 8, Waterloo Street, Birmingham, 2. Mr. Halliday has been with the company for twenty years. He served his apprenticeship in the works and has had experience in the technical office and more recently in sales and estimating. During the war he held a commission in the R.E.M.E. and served overseas. He has lately been concerned with the company's export sales.



Mr. F. J. Halliday

Mr. F. Marsden, ASSOCIATE I.E.E., electrical engineering assistant to the East Riding county architect, has been appointed general manager of Dale Electric (Yorkshire), Ltd., Filey. He was previously assistant distribution engineer with the Settle & District Electricity Co.

Bakelite, Ltd., has announced the appointment of **Mr. W. E. Cooper** as assistant managing director (commercial); **Mr. F. J. Robinson** as assistant managing director (production); **Mr. G. Dring** as research and development director, and **Mr. C. C. Last** and **Mr. G. W. Hodds** as joint general managers. They have all been with the company for many years, and will continue to operate from the head office at 12, Hobart Place, London, S.W.1.

The Eastern Electricity Board has appointed **Mr. E. A. Cullen,** M.I.E.E., formerly distribution engineer with the Mersey Power Co., as engineer, Essex Sub-Area.

Mr. M. I. Barstow leaves the service of the British Electricity Authority at the end of this month to take up farming in Bedfordshire. He was first assistant to the transmission engineer, S.E. England District, C.E.B., and on the setting up of the B.E.A., he was appointed transmission engineer for the Eastern Division. At a farewell dinner given in London on 17th September, at which seventy of his colleagues, both from the B.E.A. and former C.E.B. staffs, and from many consultants and contractors' establishments were present, tributes were paid to Mr. Barstow by Mr. W. N. C. Clinch (divisional controller, Eastern Division) who was in the chair; Mr. J. N. Waite (divisional controller, London); Mr. C. F. Bolton (transmission engineer, South Eastern Division); and Mr. J. A. Lee (B.E.A. head office). Mr. Waite presented Mr. Barstow with a gold wrist watch.

Lieut.-General Sir W. G. Lindsell, G.B.E., K.C.B., D.S.O., M.C., who has been a director of Petrochemicals, Ltd., for the past two years, has been elected chairman of the board in place of **Mr. H. Stuart Ebben.** Mr. Ebben has been chairman of Manchester Oil Refinery, Ltd., since its inception in 1938 and retains his seat on the board of Petrochemicals, Ltd.

Mr. W. T. Cooper, B.SC., A.M.I.E.E., who, for the past five years has been scientific editor and head of the Publications Department of the British Coal Utilisation Research Association, has been appointed assistant secretary (editorial) of the Institute of Fuel. Mr. Cooper was formerly assistant editor of the *Journal* of the Institution of Electrical Engineers.

Following the recent resignation of **Mr. E. C. Green** as manager of the Wholesale Department of " His Master's Voice " household appliances, **Mr. G. S. Heymer** has been appointed assistant home sales manager to this Division, taking over both retail and wholesale distributor contracts under **Mr. J. S. Warren.**

Mr. V. Gardner has relinquished his position with Smiths Motor Accessories, Ltd., to join Benjamin Electric, Ltd., as their publicity and sales promotion manager. He commences his new duties on 27th September.

Reviving what was an annual event before the war, the **Hon. Mrs. Leslie Gamage** gave a cocktail party at Claridge's on 9th September for members of the G.E.C. overseas staff and their wives. Among the fifty or so guests present, many of them in England on leave, were representatives from all overseas territories with G.E.C. branches.

Obituary

Mrs. Wadeson.—We are sorry to learn that Mr. M. Wadeson, manager of the Nottingham Sub-Area, East Midlands Electricity Board, and former Nottingham city electrical engineer, has suffered a bereavement by the death of his wife, Mrs. Dorothy Rosalie Wadeson.

Lady Fleming.—The death occurred on 15th September of Lady (Rose Mary) Fleming, the wife of Sir Arthur P. M. Fleming, of the Metropolitan-Vickers Electrical Co., Ltd.

WILLS.—Sir Percival Bower, chairman of the Birmingham Electric Supply Committee, and a member of the Central Electricity Board, left £30,109 gross (£30,005 net).

Sir William Reavell, founder and managing director of Reavell & Co., Ltd., and a past president of the Institution of Mechanical Engineers and the British Engineers' Association, left £125,871 gross (£125,819 net).

Mr. R. E. G. Horley, M.I.E.E., M.AM.I.E.E., works manager and chief engineer at the Eastleigh factory of Pirelli-General Cable Works, Ltd., left £8,380 gross (£8,260 net).

Books Received

The Principles and Methods of Telemetering. By P. A. Borden and G. M. Thynell. Pp. 230; figs. 106; index. Chapman & Hall, Ltd., 37, Essex Street, London, W.C.2. Price 27s. in U.K.

Fundamentals of Electricity and Magnetism (3rd Edition). By L. B. Loeb. Pp. 669; figs. 221; index. Chapman & Hall, Ltd., 37, Essex Street, London, W.C.2. Price 36s. in U.K.

The Presentation of Technical Information. By R. O. Kapp, B.SC.(ENG.), M.I.E.E. Pp. 147; index. Constable & Co., Ltd., 10, Orange Street, London, W.C.2. Price 6s.

Asbestos. By A. E. Williams, F.C.S. Pp. 44; figs. 9. Emmott & Co., Ltd., 21, Bedford Street, London, W.C.2. Price 2s. 6d.

I.E.E. Meetings

IN addition to the ordinary meetings and sectional meetings of the Institution of Electrical Engineers for the first half of the 1948-49 season the meetings so far arranged by the **Education Discussion Circle** are:—27th October: Discussion on " Graphical Approach to RL and RC Circuits," to be opened by Mr. H. E. Dance. 15th November: Discussion on " What Fundamental Principles should be illustrated in Electrical Engineering Courses, and at what Stage should they be introduced," to be opened by Prof. J. T. MacGregor-Morris.

The **Informal Meetings** of the Institution commence on Monday, 25th October, when the President will open a discussion on " A Western European Power Network?" The other meetings are as follows:—22nd November: Discussion on " Single-Phase to Three-Phase Conversion Systems," to be opened by Mr. A. N. D. Kerr. 24th January: Discussion on " Generation of Electricity by Gas Turbine Plant," the opener to be announced.

High-Voltage Transmission

German and Russian Reports

FIVE reports on d.c. transmission at very high voltages have been issued by the British Electrical and Allied Industries Research Association. Three of these were compiled by Dr. F. Busemann (who came to this country under the Darwin scheme) and the other two reports were translated by him from Russian sources.

The first report, Z/T67 (6s. net), summarizes work of Siemens-Schuckert in Germany—particularly in connection with the 70-mile Elbe-Berlin d.c. experimental line for carrying 60,000 kW at 400 kV by two 200-kV (to earth) underground cables. The trials were not completed owing to war damage, but particulars, with 21 diagrams, are given of the general scheme and of the rectifiers and other electrical equipment. A 1·8 million-V d.c. generator was constructed for d.c. cable testing. Economy through the use of an earth return is considered to be small and likely to be offset by damage through corrosion of pipes, etc. The increase in voltage possible with d.c. cables, as compared with well insulated a.c. cables, is often overestimated, though breakdown voltage decreases with time much less than with a.c. The intention was to use solid-filled cables up to 400 kV to earth. It is suggested that tests should be started immediately with particular reference to possibilities in the British Commonwealth ten years from now.

Economic comparisons between a.c. and d.c. are made in Z/T68 (18s.) and Z/T69 (24s.) The former deals with d.c. line costs and contains detailed estimates which appear to show that underground cables cost from 1·42 to 1·65 times as much as overhead lines, depending on the distance. The latter presents a comprehensive economic and technical comparison between d.c. and a.c. systems and includes a bibliography. The conclusion is that a.c. will be found preferable in Central Europe, where maximum distances would be 370 to 500 miles (600 to 800 km) with intermediate stations, but that in the U.S.S.R., d.c. would find scope partly because distances might be upwards of 600 miles (1,000 km) or maintenance difficulties would make cables more suitable. Further technical considerations applying to Russia are given in Z/T70 and Z/T71 (both 7s. 6d.). The subject matter of these includes the operation of transvertor valves, d.c. switching, a modern grid-control and regulating circuit and a discussion of problems awaiting further investigation.

Other new E.R.A. Reports on high-voltage practice in Germany are:—G/T206 (6s.), Siemens-Schuckert switchgear developments; G/T209 (12s.), applications of h.v. circuit breakers; G/T211 (15s.) switching stations, earthing, insulation levels and protection; and G/T210 (9s.) saturable reactors.

Power Generation Statistics

Further Increase in August

WE reproduce below a table prepared by the Ministry of Fuel and Power showing the electricity generated and sent out, fuel consumed and installed plant capacity for the month of August and the completed portion of this year:—

	Fuel consumed* Thousand tons		kWh generated			kWh sent out	Installed capacity (m.c.r.)
	Coal	Oil	Steam	Water power	Total†		MW
British Electricity Authority	1,962	1	3,166	35	3,212	3,022	12,661
North of Scotland*	13	1	18	62	82	81	322
Total for August, 1948	1,975	2	3,184	97	3,294	3,103	12,983
Total for August, 1947	1,692	2	2,690	70	2,768	2,604	12,451
Per cent increase or decrease on 1947	+16·7	—	+18·4	+38·6	+19·0	+19·2	+4·3
Total January-August	17,950	24	28,953	826	29,881	28,177	—
Corresponding period of 1947	16,665	37	26,449	761	27,313	25,745	—
Per cent increase or decrease on 1947	+7·7	−35·1	+9·5	+8·5	+9·4	+9·4	—

* Including North of Scotland Hydro-Electric Board and Lochaber Power Co.
† Including generation by other means amounting to 13 million kWh in August 1948.

Views on the News

By REFLECTOR

AT first sight there appears to be some justification for the view put forward at a meeting of the Halifax Chamber of Commerce that the electrification of textile mills and the export of generating plant should not proceed while there is a power shortage. The fact is that power shortage has to be viewed against the background of the imperative need for greater industrial efficiency and for exports to requite our imports. Many textile mills are undoubtedly out of date and can be revivified only by electrical means. As regards export trade, electrical plant is a " best seller " and a very remunerative line. The extra consumption of converted mills and any loss of generating capacity due to exports must be counterbalanced by economies in non-essential uses of electricity and so it looks as though some degree of hardship is inevitable for the next three or four years.

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In last week's *Electrical Review* Mr. R. H. Bent again reproves me for my comments on his suggestions for improving power engineers' salaries, although this time I merely quoted from the *Electrical Power Engineer*. I am definitely in favour of better pay for power station men but I think that their case is not helped by staking too high a claim, even if it is only intended as a bargaining counter with a compromise in view. There is no doubt that the present scale is not commensurate with the qualifications which they are required to possess and the responsibilities which they have to shoulder and should be bettered.

◆ ◆ ◆

A correspondent of the *Daily Mail* suggests that as the use of electricity is to be restricted this winter, hotels and cafés might go back to the old Continental method of lighting by candles. I don't know what hotel staffs will think of the extra work, inconvenience and cost involved by this suggestion and apart from satisfying the writer's craving for " graciousness and sentiment " my impression is that it is not less lighting but more lighting that the average hotel needs and that this should be practicable, by overhauling installations, without imposing any further strain on the already overloaded electricity supply system. At the Eastbourne Conference of the Association of Public Lighting Engineers I heard several quite independent complaints of the difficulty of finding a place where the lighting was good enough for reading in comfort, and this applied especially to bedrooms.

◆ ◆ ◆

There is point in the assertion of " The Crabtree " (published by J. A. Crabtree & Co., Ltd.) that the laying down of minimum standards and the establishment of " proving houses " in some overseas countries has tended to encourage the production of articles that just pass the official tests and no more. This has often been of advantage to British manufacturers whose products have possessed just the " little more " that makes all the difference. I am not quite sure, however, of the soundness of the suggestion that the establishment of a British test house (by E.D.A. and the B.S.I.) might lead to the development of a similar tendency here. Its aim is to eliminate unsound and unsafe apparatus, which in the absence of any power to prevent the production of such apparatus, is a very desirable thing.

◆ ◆ ◆

The arrangement whereby electricity consumers can pay their bills at a bank, in force in Leeds for some years, has been extended to other towns. A Yorkshire paper reports that a woman taking advantage of the scheme for the first time said to the bank clerk as she took her receipt: " Now I want you to send someone down to mend my vacuum cleaner."

◆ ◆ ◆

At a " load spreading " meeting in a western town an official is reported to have said: " The real defaulter is the man who has a bath and puts on two radiators, one at the back and one at the front, to dry himself." I should think that such a man has every chance of being suddenly cut off without the Electricity Board's intervention.

◆ ◆ ◆

A man fined at Northwich for wrongfully abstracting and using electricity recently pleaded guilty to abstracting the electricity but denied consuming it. I suppose electricity can be abstracted and not used. For instance, a battery could be charged with it for future use.

South Western Board's Headquarters

BRISTOL PREMISES OPENED BY LORD CITRINE

THE site of the new headquarters of the South Western Electricity Board at Colston Avenue, Bristol, which were formally opened by Lord Citrine, chairman of the British Electricity Authority, on Friday last, was acquired by the Bristol Corporation Electricity Department in 1931, and in 1935 Sir Giles Gilbert Scott was asked to design a building to take the whole of the office staff, with showrooms, meter testing station and central garage. During the war construction work ceased, and the shell of the building was used as an aero-engine factory. The building vested in the British Electricity Authority in April last, and the South Western Electricity Board decided to make it its headquarters. The greater part of the building will be used as planned and will accommodate the staff of the Bristol and North Somerset Sub-Area, together with the Bristol Service Centre.

Artist's impression of the new Bristol headquarters of the South Western Electricity Board

The opening ceremony was presided over by Mr. S. F. Steward, chairman of the South Western Electricity Board, who welcomed Lord Citrine. He said that the Board had taken over electricity supply in an area of over 5,000 sq. miles with more than half a million consumers. The main framework of organization was complete, and they had preserved throughout the principles of effective decentralization to ensure that personal service to their consumers was maintained and improved.

The Lord Mayor, Alderman C. R. Gill, said that he had hoped that room would have been found in the new organization for locally elected representatives of the people on the administrative side.

In declaring the new building open, Lord Citrine told the Lord Mayor that the Consultative Councils which would be instituted shortly would provide opportunity for local representation, and would be consulted by the Area Boards. In the South West, the job of welding together thirty-nine separate undertakings in so short a time was a tremendous task. The number of generating stations in the South Western Area was twenty-six with a total capacity of 436,000 kW. There was still a considerable deficiency of generating plant in the Area, as measured against the demand but considerable developments were planned.

At Newton Abbot a 15,000-kW set had been installed and the work at Portishead on the new 52,000-kW set was approaching completion. A further extension of the Hayle station, consisting of a 20,000-kW turbo-alternator was planned for next year, and a new station with an ultimate capacity of 180,000 kW was being constructed at Plymouth, which it was hoped would start generation in 1951. A new station with an ultimate capacity of 120,000 kW would also be built at East Yelland, to come into operation at the end of 1951. They had hoped to provide a new station of 360,000 kW at Portishead to come into operation in 1953, but owing to considerations of national defence, a number of alternative sites on the Severn Estuary had been investigated, and it might be that a smaller station would have to be built at Sharpness. With the present limitations there was no prospect of the supply overtaking the demand for electricity until 1952 or 1953 at the earliest.

Lord Citrine concluded by unveiling a tablet commemorating his visit.

Radio Wavelength Agreement

AT the conference of representatives of 32 European member states of the International Telecommunication Union held in Copenhagen agreement was reached regarding the allocation of long and medium radio wavelengths. Russia and the Balkan countries have subscribed to the agreement. Next month a conference is to be held in Mexico City to deal with shorter wavelengths.

Under the new arrangements Great Britain is allocated one long and thirteen medium wavelengths which are said to be sufficient to enable the British Broadcasting Corporation to carry on its present system.

Beznau Power Station

OPEN-CYCLE GAS TURBINE PLANT

IN an account of developments in gas-turbine design which appeared in the *Electrical Review* of 7th May, preliminary particulars were given of the open-cycle machines for a new power station at Beznau, near Baden, Switzerland. This station will have a capacity of 40,000 kW in two units, one of 13,000 kW which was commissioned at the end of last December and one of 27,000 kW which is scheduled for operation during the coming winter. Its electrical output is transformed up to feed into the high-voltage system of the power-station owners, the Nord-Ost-Schweizerische Kraftwerke (NOK), whose winter output represents one-fifth of the potential for the country. A second gas-turbine station of 20,000 kW is to be built at Weinfelden for 1949-50.

With 3,000 hours of operation these two stations could produce 190 million kWh, which would cover 73 per cent of the loss of hydro-electric output in a very dry winter. For the company's area as a whole the output potential over a number of years has varied between − 24 per cent and + 11 per cent from the average winter conditions of 1945-46.

The above particulars were obtained during a visit to Switzerland last month, when we discussed with Dr. Adolf Meyer, chief research engineer of Brown Boveri Co., the constructional and operational features of gas turbines designed as a supplementary means of generating electricity and were afforded an opportunity of inspecting their component parts. An important point under Swiss conditions, he pointed out, is that in winter when the demand is greatest rain-water is locked up in glaciers to be released in spring into lake reservoirs. If warm weather comes late in the year the water in the reservoirs may sink to a dangerously low level, so a reserve of perhaps one-third of the water has to be retained.

The availability of gas turbines for continuous running obviates this necessity, and in the case of Beznau enables water power equivalent to 26 million kWh to be used in the winter. The installation of thermal plant would be justified on that account, Dr. Meyer maintains, however rarely it was called upon.

As a result of heavy rainfall last autumn compensating for the earlier drought, and the warm spring this year, the 13,000-kW set ran for only 370 hours, so useful figures of operating costs have not yet become available. For the following estimates of performance (originally prepared by Dr. A. Engler for NOK and based on tenders) we are indebted to Mr. E. A. Kerez of Brown Boveri.

In a comparison of various forms of heat engine it is shown that a 25,000-kW steam turbine with oil-fired boiler and steam conditions of 1,175 lb per sq in. and 930 deg F (80 atm and 500 deg C) would have cost £18·8 per kW and used 0·66 lb (300 gm) of oil per kWh. For a gas turbine of similar rating the corresponding figures were £19·3 and 0·58 lb (264 gm), and for two 12,500-kW units £22·5 to £27·5 and 0·66 to 0·56 lb (300 to 253 gm). Two 12,500-kW diesels would have cost £31·4 with a fuel consumption of 0·53 lb (242 gm) per kWh. Prices (at 17·34 francs to the pound sterling) are

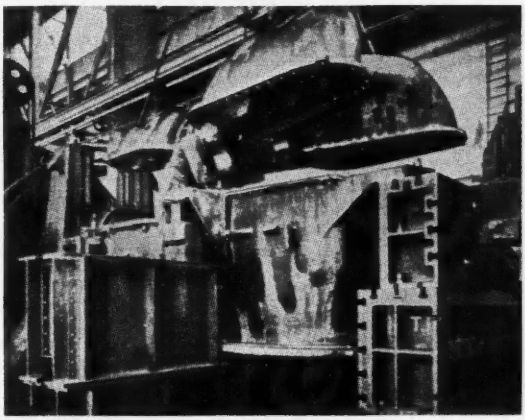


Fig. 1.—Casing of low-pressure gas turbine

without transformers and high-voltage switchgear but include fuel-storage tanks for 3,000-hr running.

For the 40,000 kW of plant as finally selected the estimated overall expenditure amounts to £922,000 or £23 per kW installed, allocated as follows:—Purchase of site, £14,400; building (including railway sidings and roadway), £213,300; gas turbines with generators, oil storage tank and cranes, £553,000; transformers and electrical connections to network, £124,000; building supervision, £17,300. Allowing 3·5 per cent for interest, 4·5 per cent for amortization (based on 17 years' life at 3 per cent interest on the renewal reserve) and 1 per cent for maintenance, the annual standing charges amount to 9 per cent of the capital, i.e., £2·07 per kW.

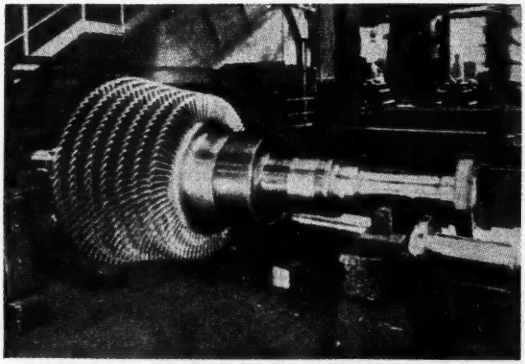


Fig. 2.—Fully bladed rotor of 13,000-kW high-pressure unit

Average fuel-oil consumption per kWh is 0·6 lb (272 gm) per kWh, and the operating staff consists of three men per shift. On this basis the standing charges per kWh generated are at the rate of 0·497d. for 1,000 hr; fuel costs with oil at £8 per ton (compared with imported coal of lower calorific value at about £7 per ton) are 0·525d. and operation wages 0·006d. The overall figures per kWh are thus 1·028d. for 1,000 hr, 0·779d. for 2,000 hr and 0·696d. for 3,000 hr of operation per annum.

Each turbine consists of a high-pressure unit and a low-pressure unit. The high-pressure shaft of the turbine and the compressors of the smaller set will make 4,750 r.p.m., reduced by gearing to 3,000 r.p.m. for the alternator. The latter speed has also been adopted for the low-pressure shaft at the maximum for its variable speed and for both shafts of the 27,000-kW turbine. For starting the turbines 280-kW (h.p.) and 46-kW (l.p.) motors are required in one case and 630 kW and 900 kW in the other. River water for the air coolers amounts to 475,000 gal. per hr (600 litres per sec); the cooling water pumps are driven by 280-h.p. motors.

Outputs are based on air-intake and cooling-water temperatures of 41 deg F (5 deg C). With crude oil having a lower calorific value of 17,600 B.Th.U. per lb (9,800 calories per gm) the guaranteed thermal performance at maximum loading of the 13,000-kW turbine is 30·6 per cent and of the 27,000-kW turbine 34·0 per cent. Including energy consumption of auxiliaries and losses in transformers, the average efficiency would be 32·4 per cent.

The engine-room interior measures 214 by 54·5 ft (65·25 by 16·65 m); 21·3 ft (6·5 m) below its floor is the floor of the basement in which are housed the pipe-work, power cables and signal cables and also the coolers for the compressed air.

The prices given above relate to early post-war conditions and are included only for the purpose of general comparison.

Application of Tungsten Carbide

THE certainty of maintaining high quality and precise dimensional limits in conjunction with an ever-increasing flow of production can only be possible with the continued and intensive use of tungsten carbide. This is demonstrated in a new film " The Wimet Age " produced by A. C. Wickham, Ltd. The film establishes the fact that a new technique is necessary in the application of tungsten carbide. The film shows the correct methods of choosing the style and grade of " Wimet " tools for various operations and the manner in which the recommended shapes, sizes and rakes should be exploited to obtain full benefit from their use. Reasons are given for the need for the scientific setting and servicing of cutting tools and the methods used to achieve precisely finished tools are simply explained and easily understood. Copies of the film will shortly be available for showing in engineering works, technical colleges, etc., and for use in some countries abroad copies in the native tongue will also be available.

A.P.L.E. Conference

DISCUSSION OF STREET LIGHTING PROBLEMS

KEEN discussions followed the papers presented at the conference of the Association of Public Lighting Engineers at Eastbourne last week. Especial interest was shown in the subject of "Unidirectional Lighting of Double Carriageway and One-Way Roads" dealt with by Mr. J. S. Smyth and effectively illustrated by means of an ingenious model. Mr. C. C. Smith (Liverpool) said that with the large type of roundabout unidirectional lighting left the roundabout a dark mass and there should be some form of background lighting to assist approaching traffic. He asked what the author would suggest when one road of a dual carriageway had to be used temporarily for both lines of traffic during repairs.

Councillor H. Eastwood (Manchester) suggested that at the approach of a side road to the main road, instead of the unidirectional lamp being immediately beyond the approach of the side road, it should be placed at the junction.

Mr. R. S. Bradley (Southern Electricity Board) said that the Portsmouth experimental installation showed the great possibilities of the unidirectional system for both lighting and economic reasons. This system of lighting was still experimental and he looked forward to the time when unidirectional units would be used back to back.

Mr. N. Schofield (Huddersfield) spoke of the success of the Huddersfield installation and said that although there had been complaints of glare, he did not think it was any greater than with a normal lighting system. He asked if the author had considered whether the cut-off behind the lamp could be altered from 25 deg to, say, 45 deg which would improve the brightness of the street for four or five spans ahead.

Mr. H. W. Hime (South Eastern Electricity Board) suggested that more attention should be given to the method of suspending the lanterns when using unidirectional lighting. His own impression when riding along the Huddersfield road at anything over 10 m.p.h. was that he was running along a brick wall. Alderman F. Doggett (Cambridge) asked what were the possibilities of the unidirectional system in built-up areas. Mr. G. Syddall ((Middleton) inquired whether consideration had been given to illuminating road signs by this lighting.

Mr. Smyth, replying, agreed that this matter was in the experimental stage. He did not think unidirectional lighting would be suitable in built-up areas but it had not been tried: it would be very interesting to have an installation in a street without shops. He did not think people shopping would like it. There was no reason why a unidirectional system with a cut-off of 70 deg should have more glare than a normal system. It was necessary to keep down the costs of installation and for that reason he did not think there was much likelihood of a coupled system, such as had been suggested.

The Council of the Association

Left to right, seated: Mr. H. C. Brown, Mr. E. C. Lennox, Mr. T. Wilkie, Mr. N. Boydell (president), Mr. A. S. Tapsfield (vice-president) and Mr. E. J. Stewart. Standing: Mr. E. Stroud, Mr. L. A. Doxey, Mr. P. Crawford Sugg, Mr. E. Howard, Mr. R. Lee, Mr. P. Richbell, Mr. C. C. Smith, Mr. E. Evans (secretary), Mr. R. Parker and Mr. J. H. Morrison

Lighting Near Aerodromes

Opening the discussion on the paper by Dr. English and Mr. Holmes on "Street Lighting in the Vicinity of Aerodromes," Mr. J. Allen (Revo) said he had recently been concerned with a scheme in which the distance stipulated

by the Ministry within which screening had to be employed was five miles. It seemed that the word "vicinity" used in this Order was elastic.

Mr. C. C. Smith (Liverpool) said the expense in the use of cut-off lamps near aerodromes was not so great as many people thought. At Liverpool it had been found that 140-W sodium lamps mounted at a height of 25 or 26 ft with 35 yd spacing, centrally mounted, gave a splendid light and, at the same time, facilitated servicing. Moreover, the revealing power was

Viscount Falmouth with Mr. W. N. C. Clinch (Controller, Eastern Division, B.E.A.) and Mr. W. J. Oswald (member, S.E. Electricity Board)

excellent. At Liverpool they had not been allowed to use columns higher than 8 ft in the vicinity of an aerodrome and experiments were now going on in regard to screening.

Councillor H. Gorton (Worsley U.D.C.) said that in his district it had taken three years to obtain consent to light a certain mile of road and during that time the cost rose by £1,000.

Mr. G. C. Marsland (borough engineer, Cheltenham) said he had in mind a well-lighted roadway where screened lighting was used which was a great pleasure to pedestrians but was a source of glare to drivers. Manufacturers of lanterns should give greater attention to the effective screening of street lights.

Mr. F. C. Clark (S.W. Scotland Electricity Board) urged that greater attention should be paid by manufacturers to focusing arrangements on street-lighting equipment to make it easier for street-lighting attendants. Mr. C. W. Frobisher (Manchester) suggested that a standard uniform system of lighting should be adopted, using different colours for aerodrome lighting and street lighting.

Dr. English replying to the discussion said that it might well be that the increase of the distance from three to five miles mentioned by Mr. Allen was due to the fact that planes now landed at much greater speeds than formerly and there must be a longer approach. On the question of extra cost of street lighting to meet the Regulations, he thought it likely that the Ministries of Transport and Civil Aviation would have to come to some arrangement in this matter and make some grant to local authorities concerned. Whilst agreeing with Mr. Smith that screened lighting was no hardship when planning a new installation, it was a hardship when an existing installation had to be modified. He did not think that there should be screening in built-up areas because some light was wanted on buildings.

The height of lamp columns in the vicinity of aerodromes was a matter which would take a long time to settle. Attention was being given by manufacturers to cut-off lighting, and on focusing Dr. English said that the early installations were allowed to get into such a bad state from this point of view that it was felt better to have no focusing arrangements at all. Therefore, at the present time, the only variation was the variation of the lamp filament which was controlled by the British Standard Specification, and users could see to it that this was modified if they thought it necessary. There were difficulties in using different colours for street lighting and for runway lighting.

Basic Principles

In the discussion on the paper by Mr. D. M. Thompson (distribution superintendent, Wigan Gas Department) on "The Basic Principles in the Design of Street Lighting Installations, and their Practical Application," Mr. R. S. Bradley (Southern Electricity Board) said that he believed that the non-cut off system of lighting would be forced on them on account of the cost of other methods. It did not matter what colour road surfaces were; what mattered was to obtain suitable light reflecting properties under both wet and dry conditions.

Mr. E. Stroud (Brighton Lighting & Electrical Engineering Co.) discussed cut-off street lighting, which had been described as much more expensive. With cut-off lighting very much less intensity of the light source was required for equivalent visibility. If electricity could be saved, as it would be, the first cost was not of such great importance. Central suspension reduced the first cost.

Monsieur L. Gaymard, who is in charge of the street lighting of Paris, said a great use was made of brackets for central suspension in Paris. In France all new street lighting installations were to be electric.

Mr. J. M. Waldram (G.E.C. Research Laboratories) recalled early efforts to produce what was then called a semi-cut-off system and said that if the candle-power could be got into certain directions, a little below the horizontal, it was possible to build up the brightness of the road surface considerably and that reduced glare. The tendency was to go for more cut-off than was used in the early experiments and this was made possible by the introduction of new equipment. The use of cut-off would reduce patchiness.

The author, replying, said he did not agree

that cost did not matter, but obviously cheap equipment should not be used. He agreed, however, with Mr. Stroud that in the long run, cut-off lighting would not be any more expensive than high-angle lighting.

Annual Luncheon

Speaking at the Association's annual luncheon Viscount Falmouth referred to the great improvements that had been made in public lighting since the formation of the Association and emphasized the importance of adequate public lighting for preventing road accidents and crime.

Referring to the question of cost, he said that we must look for schemes which were economical to install and maintain; otherwise it would be a long time before the type of public lighting generally desirable throughout the country would be achieved.

The President (Mr. N. Boydell) also spoke of the progress that had been made during the lifetime of the Association. Public lighting was one of those instances in which gas and electricity, by healthy competition, had produced results which would otherwise not have been possible.

Mr. J. R. W. Alexander (British Gas Council) expressed the view that under nationalization, competition generally between the gas and electricity industries would continue but its disadvantages might disappear in that one competitor would not be induced to replace the satisfactory lighting of its rival, without advantage proportionate to the expenditure involved, whilst competitors' interests might not be so largely directed to the main roads and public places to the prejudice of other streets.

Lighting Developments

Opening the discussion on Dr. J. N. Aldington's paper on "One Hundred Years of Research and Development in Electric Light," Mr. H. W. Hime (South Eastern Electricity Board) pointed out there were now available two distinct types of light sources. There was the low brightness source in the fluorescent tube which, when the restrictions were eased, would come into greater and greater use for public lighting. There had also been shown by Dr. Aldington high brightness sources which lent themselves admirably to the production of more and more efficient street lighting schemes. This raised the question of glare and also the mounting height and at future conventions he hoped to see demonstrations of high brightness sources mounted at heights of 40 ft or 50 ft or more.

Mr. A. G. Penny (G.E.C.) suggested that users of lamps must make a special effort to keep abreast of lamp developments, while Mr. R. H. Rawll (London Electricity Board) thought that it might be useful to re-examine some lines of research that had been discarded. Councillor H. Eastwood (Manchester) advocated curved fluorescent lamps.

Dr. Aldington, replying, agreed that curved fluorescent lamps would be advantageous in certain circumstances, but at present the need was for production and for the present the fluorescent lamp in this country would continue to be straight.

Safety on the Roads

At the final session on Friday last, a paper entitled "Safety First on the Highways, with Special Reference to Public Lighting" was read by Mr. C. N. Melton (street lighting inspector, Dagenham). In the discussion, which was opened by Mr. A. Trigg (Ministry of Transport), Mr. Heale (Tripiex Safety Glass Co.) said he was pleased to see that several lighting fittings manufacturers were using a form of acrylic plastic material instead of ordinary glass and he thought that the British Standards Institution should be approached with a view to considering a standard specification for such material. Mr. H. W. Hime urged the need for a third class of street lighting as an additional aid to safety on the roads, and also advocated greater uniformity in street lighting.

Mr. R. S. Bradley (Southern Electricity Board) said that the floodlighting of pedestrian crossings might instil a confidence which could prove to be misplaced.

Mr. J. M. Waldram (G.E.C.) emphasized the unreliability of statistics and the difficulty of getting a definite quantitative estimate of the reduction of visibility caused by glare.

Councillor C. Smart (Rothwell) referred to the confusion caused to engine drivers by coloured street lamps in the vicinity of railways.

The author, replying, thought that some variation of the lighting of pedestrian crossings would assist both pedestrian and motorist. It did not appear that the effect of mercury lamps near railways could be got rid of by polarizing the light and therefore it seemed the lamps would have to be screened.

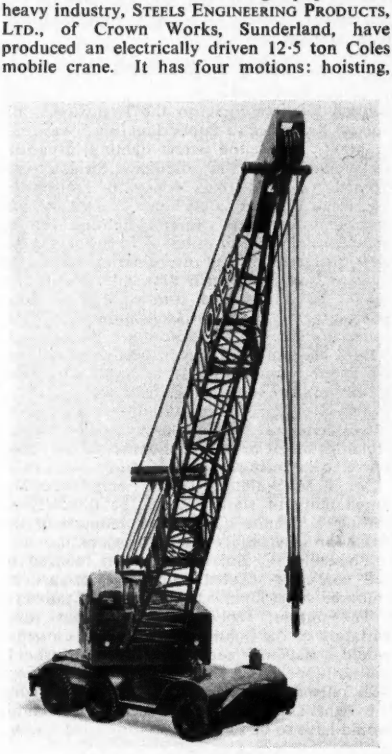
Open Forum

At the conclusion of Mr. Melton's paper there was an "Open Forum," at which the opportunity was given for matters to be brought forward for the consideration of the council later. Mr. J. Stanley (Poole) asked the Council to consider the formation of more provincial centres. Mr. B. Besemer (London Electricity Board) thought that it was unfair to the user to mark fluorescent and discharge lamps with wattages which did not include the consumption of the choke. Mr. F. C. Sage (borough surveyor, Watford) said that he had yet to see a lamp and column designed as one unit. Mr. A. G. Penny (G.E.C.) defended the policy of the lamp makers in rating the wattage of the lamps solely on the lamps' consumption.

Mr. G. Syddall (Middleton) asked the Council to take some steps to secure financial assistance from the Ministry for boroughs like his own which adjoined towns that could afford a very much higher standard of lighting.

Mobile Crane

TO assist in meeting the demand for more flexible mechanical handling equipment in heavy industry, STEELS ENGINEERING PRODUCTS, LTD., of Crown Works, Sunderland, have produced an electrically driven 12·5 ton Coles mobile crane. It has four motions: hoisting, derricking, slewing and travelling, each being operated by separate motors, which are controlled from the driver's seat on the revolving superstructure. All motions, except travelling, are stopped by means of electro-magnetic brakes, thus ensuring the maximum safety of operation. The motors are equipped with switches for automatic reversal of the steering gear when the driver faces the rear of the chassis. The controls are also fitted with safety devices including self resetting limit switches to prevent overwinding and over-lowering on the hoisting motion and to prevent over derricking.



Electrically driven mobile crane

The crane, the unladen weight of which is 22 tons, is fitted with a sectional strut type jib and travels on six double pneumatic-tyred road wheels. With a standard 30-ft jib and outriggers in position, it will lift 12·5 tons at 10 ft radius. Proportionally lighter loads can be handled at greater radii up to 29 ft, at which loads of 3·5 tons can be handled. Ground adhesion and travelling power are unaffected by the load, which can be carried with the jib in any position and an ample stability factor ensures safe working with a swinging load. The crane will also negotiate a maximum incline of 1 in 10 when unloaded.

Next Week's Events

Monday, 27th September

BOURNEMOUTH. — Wedgwood Restaurant, Albert Road, 7 p.m. A.S.E.E. (Bournemouth Branch). "Single-phase Motors—their Theory and Application," by A. N. D. Kerr.

Tuesday, 28th September

LONDON.—85, Minories, E.C.3, 5.30 p.m. Institute of Marine Engineers. Presidential address by Cdr. Sir Robert Micklem.

Wednesday, 29th September

LONDON.—Institution of Mechanical Engineers, Storey's Gate, S.W.1, 6 p.m. Institution of Heating and Ventilating Engineers. "Research for the Heating, Ventilating and Air Conditioning Engineer," by C. Tasker, director of research of the American Society of Heating and Ventilating Engineers.

LONDON. — Royal Institution, Albemarle Street, W.1. 6.30 p.m. Television Society. Third Fleming Memorial Lecture by A. Blok, O.B.E., B.SC., A.M.I.E.E.

MANCHESTER. — Engineers' Club, Albert Square, 12 noon. North-Western Fuel Luncheon Club. Luncheon followed by presidential address by W. J. Drummond.

Wednesday and Thursday, 29th and 30th September

LONDON.—Institute of Welding. Autumn meeting.

Thursday, 30th September

BIRMINGHAM.—Crown and Cushion Hotel, Perry Barr. Illuminating Engineering Society (Birmingham Centre). Ladies' night—dinner dance.

Thursday and Friday, 30th September and 1st October

CHELTENHAM.—National Smoke Abatement Society. Annual conference.

Friday, 1st October to Sunday, 3rd October

NOTTINGHAM. — Women's Engineering Society. Annual conference, including visits to a Nottingham cave, the printing works of the *Nottingham Guardian* and an opencast coal mining site and a motor tour of the Dukeries. Miss Anne G. Shaw will read a paper on "The Application of Motion Study to Textiles."

Sunday, 3rd October

NEWCASTLE-ON-TYNE.—I.E.E. North-Eastern Students' Section. Visit and inspection of electrical layout at Odeon Cinema, Pilgrim Street.

Yorkshire E.D.A. Conference

Electronics, Lighting and Rural Development

THREE papers have been presented at this week's conference at Scarborough of the Yorkshire Area of the British Electrical Development Association. The first, delivered on Wednesday, was a "Review of Gas Filled Electronic Tubes" by Mr. J. A. Darbyshire, M.SC., PH.D., chief physicist to Ferranti, Ltd. After an introduction explaining the "mechanism" of electrical discharges in gases, the author mentioned the four different types of tube—cold cathode (non-activated), cold cathode (activated), hot cathode and pool-type cathodes and went on to deal briefly with the Geiger-Müller counter, gas filled photo-electric cells, non-activated cathodes, neon glow lamps, gas filled tubes for signs, voltage stabilizers, activated cold cathodes, neon stroboscopic lamps, the cold-cathode triode, the h.p. and l.p. mercury-vapour lamps, hot-cathode tubes, the crater lamp, gas filled diode and triode rectifiers and the ignitron.

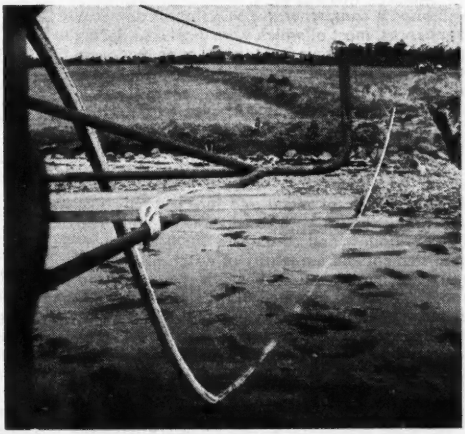
In a paper on "Modern Lamps and Lighting Practice" (Thursday) Mr. W. R. Stevens, B.SC., M.I.E.E., F.I.E.S., summarized in useful form the characteristics and applications of carbon-arc, incandescent filament, sodium, h.p. mercury-vapour, fluorescent and flashing discharge lamps.

Also on Thursday, Mr. R. B. Richardson, A.M.I.E.E. (sub-area commercial officer, Yorkshire Electricity Board) reviewed rural development in a broad way. In a "survey of the potential" he dealt with types of farm and farming methods, touching upon such points as population and housing. The next section of the paper attempted a grouping and classification and showed what equipment one might expect to find in a typical farmhouse and farm cottages and in a dairy farm and mixed farm. In addition to this mention was made of the possibilities in villages and hamlets and in rural industries, a list of which was given.

Consideration was next given to planning and engineering requirements with tables analysing the use of single-phase motors on 520 farms; transformers, connected loads and annual maximum demands; and typical villages showing connected loads and demands. The paper concluded with notes on the staff required for rural development work and publicity and service methods.

33-kV Submarine Cable

EXTENSIONS to the 33-kV system of the Electricity Board for Northern Ireland from Ballylumford power station required a double-circuit submarine cable-crossing of 914 yd in Larne Lough, Co. Antrim. For this Henley's manufactured and laid two continuous lengths of 0·15 sq in. screened S.L. double-wire armoured and served cable with external diameter of 4·126 in. The lagged drums were 11 ft 8 in. in diameter and 7 ft 2 in. wide, and weighed 28 tons.



Henley 33-kV cable being laid in Larne Lough

The cables were laid alongside each other from Millbay on Islandmagee to Magheramorne Point on the mainland. The beaches shelve steeply and at one point on the route the depth of water at high spring tide was only 12 ft., which necessitated the employment of a craft of minimum draught but seaworthy enough to convey the cables 35 miles from Belfast.

A steam cargo vessel, *Spartan*, of 100 tons gross, flat bottomed and drawing about 8 ft 6 in. laden, was fitted out under the direction of Henley engineers and towed by the tug *Somerton*. Owing to draught limitations and other considerations each drum of cable was laid separately. To avoid risk of sharp bends in the cable, a tubular steel outrigger was fitted at the vessel's bows from which the cable had to be paid out.

The cable at the Millbay shore end was pulled off at high spring tide by two tractors and

securely fixed to prevent its being dragged. The vessel was beached at the Magheramorne side of the crossing, and at low tide the finishing end was landed. When the first length of cable was laid, *Spartan* returned to Belfast to discharge the empty drum and be loaded with the second.

The ends of the cables were led up to their terminating positions on " H " poles adjacent to the banks of the lough on either side. On the foreshore, the cables were firmly anchored, and from the footings of the " H " poles up to distances of 30 yd beyond low-water mark, they were entrenched and protected with bags of concrete, divers being employed.

Strasbourg Exhibition

From a Correspondent

AT the European Trade Fair held in Strasbourg from 4th to 19th September there were over 1,300 exhibitors and nearly 600,000 visitors. Although most exhibitors were French a number of other nations participated.

The only British company at the exhibition was Electrical & General Accessories (Leicester), Ltd., of Birmingham. Whilst prospective customers had to be turned down owing to import restrictions, the company's enterprise and very fine display of electrical household appliances, accessories and conduit fittings was highly commended by French visitors. The new " Cuit-Lait " milk boiler, made of aluminium, with a perforated inner lid was on show; this prevents milk from boiling over. A well-shaped handle, anatomically designed, allows a firm grip and ease in pouring. The " Colmore " automatic heat-controlled iron, chromium plated with plastic handle, has a 750-W element and a thermostat which is said to have been subjected to a making-and-breaking test for 17 months without impairing its technical performance. The new " Chester " kettle, with a 1,250-W immersion element and thermostatic plug-ejector, was also shown.

" Calor," well-known French manufacturers, exhibited a comprehensive selection of domestic appliances, most of which were displayed during the Paris Trade Fair in May this year, and were typical examples of present French workmanship.

The firm Tavaro, of Geneva, exhibited its " Elna " portable electric sewing machine weighing only 14¼ lb (22 lb with special case).

An appliance for ironing textiles was exhibited under the name of " Electro Jeanette." This device is made of metal and looks exactly like an ironing board with a perforated top. The body is hollow and contains a 1,000-W immersion element and a quantity of water. A second (500-W) element is fixed beneath the perforated top. Steam is obtained through the bottom element, and the temperature is then raised to 160 deg C by the top element. A hand-operated shutter opens a valve, and steam passes through the perforated holes into the textile placed on top of the board.

The new " Othermo " heat-storage cooker has a hot-plate area of 20 in. by 12 in. A built-in water tank can supply up to 100 gallons of hot water daily at a temperature of about 65 deg C. Since the loading seldom exceeds 350 W, the cooker can be used in houses wired for 5-A only.

Other products manufactured in France were shown by Mazda (lamps), Thomson-Houston (micro-film equipment), Electro-Lux (vacuum cleaners), Conord (washing machines) and S.E.V. (coffee percolators). A fine display of Marconi and H.M.V. (France) radio sets was made by their agent, A. Neffizer, in the Radio Hall.

Loch Dubh Project

THE North of Scotland Hydro-Electric Board announced last week the Loch Dubh (Ullapool) project (Constructional Scheme No. 20) which will provide electricity for an isolated area of 220 sq miles of Western Rossshire with a population of 2,000 who will be served by the Board's Lochinver and Ullapool Distribution Scheme. The project, which is estimated to cost £200,000, will have an ultimate output of 4,550,000 kWh per annum. The main works are centred on the Allt a'Mhuilinn, a tributary of the River Kanaird and will utilize the waters of Loch Dubh and three other lochs in the area.

The generating station will be built near the Ullapool-Lochinver road and provision will be made for an ultimate capacity of 1,800 kW. The turbines will operate under a gross head of 515 ft. A steel pipeline, 3,700 ft long, will connect Loch Beinn' Deirg with the generating station, and at a later stage a second pipeline will be laid.

Sir William Halcrow & Partners and Blyth & Blyth of Edinburgh, civil engineers, are associated in the preparation of the scheme and the supervision of its construction.

INFORMATION DEPARTMENT

THE extensive records of our Information Department enable us to reply to most queries, but occasionally we ask for our readers' assistance in tracing names and addresses not known to us. We should be glad to have such information regarding the makers of the following:—

" Kellogg " lightning arrestor carbons.

General inquiries from readers relating to sources of electrical goods, makers' addresses, etc., are replied to by the Information Department through the post. Inquiries should be accompanied by a stamped addressed envelope.

COMMERCE and INDUSTRY

Electricity Arbitration Tribunal. Gas Works Waste-Heat Plant.

THE Lord Chancellor has appointed Sir William Fitzgerald, M.C., to be legal member and president, except as to proceedings in Scotland, and Mr. E. C. Ellen, C.B.E., M.C., and Sir Frederick Alben, C.B.E., to be members of the Electricity Arbitration Tribunal to be set up under Section 31 of the Electricity Act, 1947. The Lord President of the Court of Session has appointed Mr. D. A. Mortimer to be the legal member of the Tribunal in relation to proceedings to be held in Scotland. Mr. Mortimer will act as president in such proceedings.

Sir William Fitzgerald recently retired from the office of Chief Justice of Palestine; Mr. Ellen was manager of the Union Discount Co. and chairman of the London Discount Market Association from 1940 to 1947; Sir Frederick Alben is president of the Society of Incorporated Accountants and Auditors; and Mr. Mortimer is a Dundee solicitor who has been chairman of Pensions Appeal Tribunals in Scotland.

Registered Electrical Contractors

The October number of *Registration*, official organ of the National Register of Electrical Installation Contractors, states that at 1st September there were 1,053 contractors on the Register, with 58 applications under investigation. Attention is drawn to the revision of Section 8 of the I.E.E. Regulations dealing with the installation of discharge lamps and there is a concluding instalment of the notes on the legal obligations of the consumer, the contractor and the supply undertaking.

Instant-Start Fluorescent Lamps

Although fluorescent lamps can be started up instantaneously by applying sufficient initial voltage, in so doing part of the electron emitting material on the electrodes is torn off and the lamp is progressively affected detrimentally. Members of the Electric Lamp Manufacturers' Association will be marketing on 1st October specially designed instant-start 5-ft fluorescent lamps at the list price of 16s. 6d. each, in standard colours. They work with specially designed auxiliary gear and have the full normal life and efficiency and require no starter switch.

Longer Fluorescent Lamps

Following the announcement by the Electric Lamp Manufacturers' Association that its members are to introduce two new 8-ft fluorescent lamps on 1st January next, the General Electric Co., Ltd., gives details of the new "Osram" tubes.

These lamps will be rated at 70 and 135 W, and will be produced only in the new "natural" colour. A "cold starting" circuit will be used with the 70-W lamp, involving no preheating of the electrodes, so that there will be only one electrical contact at each end and the caps will be of the cylindrical type. This lamp will be 1 in. in diameter. The 135-W lamp represents an increase in light output of nearly 70 per cent over the previous largest lamp, the 5 ft 80 W, and will be $1\frac{1}{2}$ in. in diameter. Switchless circuits and circuits using the normal starter will be available, and the lamp will have bayonet-type caps. It will be possible to operate both the 70 W and 135 W lamps at lower currents on suitable circuits, thus obtaining a flexible range of light output from a single lamp.

Midlands Load-Spreading Exemptions

It was stated at a Midland Regional Board Press conference last week that as certain types of industry presented special problems, they would not be called upon to participate in the basic scheme of load spreading. They would, however, be expected, in consultation with the electricity authorities, to remove as much load as possible from the peak period by other means, and generally a full 20 per cent should be achieved. The industries are foundries, quarries, iron and steel scrap yards, dairies and bakeries (not retail shops), sawmills working in the open and ice-makers.

The Board is asking the Ministry of Labour to give special attention to the labour supply available for the repair of power plant. The chairman, Mr. W. H. Stokes, said that it might mean only a few thousand extra men throughout the country, but it would play a very great part in obviating disturbance to industry during the winter months. Much of the equipment in use to-day was old and would always be a source of trouble.

New Zealand Wants Men

It is announced that New Zealand is looking for a thousand unmarried British men, many of them skilled tradesmen, to help in the development of her hydro-electric power projects.—*Reuter.*

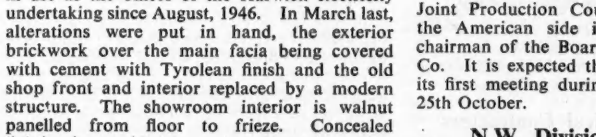
Plant Engineers' Conference

In addition to technical discussions, there will be speeches by leading industrialists at the first annual conference of the Institution of Incorporated Plant Engineers which is being held at Cheltenham Spa on 7th, 8th and 9th October. The principal speaker will be Sir Percy Mills, K.B.E., managing director of W. & T. Avery, Ltd., and vice-president of the Midland Advisory Council on Industrial Productivity, who will give an address on "The Enlightenment of Industrial Management." Other speakers will

be Dr. E. S. Grumell, C.B.E., M.I.MIN.E. chairman of the Fuel Efficiency Committee of the Ministry of Fuel and Power, Major Egbert Cadbury, joint managing director of Cadbury Bros., Ltd., and Regional Controller, Ministry of Fuel and Power (South Western Region), and Mr. C. Lacy-Hulbert, production director of Tube Investments, Ltd. The chairman will be Mr. L. G. Northcroft, B.SC., M.I.MECH.E., joint managing director of Spirax Manufacturing Co., Ltd., and Sarco Thermostats, Ltd.

Dovercourt Service Centre

A Victorian brick and stone fronted building has been re-modelled to an up-to-date design for the offices and service centre of the Eastern Electricity Board at Dovercourt, the opening of which was briefly recorded in our last issue. The upper floors of the building, which occupies a prominent corner of the High Street, had been in use as the offices of the Harwich electricity undertaking since August, 1946. In March last, alterations were put in hand, the exterior brickwork over the main facia being covered with cement with Tyrolean finish and the old shop front and interior replaced by a modern structure. The showroom interior is walnut panelled from floor to frieze. Concealed lighting in provided by a plaster trough running all round the room and containing twenty 5-ft fluorescent tubes giving an even illumination at floor level of 25 ft-candles. Additional lighting



Section of the Dovercourt service centre of the Eastern Electricity Board

will be obtained from a variety of fittings displayed for sale. At the rear, facing the door, three wide steps lead up to a smaller display room and to one side of these is a built-in cash desk. The window enclosures are illuminated by pairs of 4-ft fluorescent tubes in reflectors concealed in the soffits, giving an illumination at window bed level of 56 ft-candles. Heating will be by electric tubular heaters thermostatically and time-switch controlled, supplementary heating being provided by two 2·5-kW flush type fires set in the panelling. The electrical installation was carried out by the undertaking's own staff under the supervision of Mr. J. H. Shepherd.

The official opening of the centre by the Mayor of Harwich (Mr. E. Gant) was followed by a luncheon attended by members and officials of the Eastern Board and Harwich Corporation. Mr. C. T. Melling, chairman of the Board, observing that the showrooms would serve a large rural area, spoke of the importance of developing the use of electricity in the countryside, particularly to aid food production. Unfortunately, plans made for the supply of electricity were hindered by lack of materials.

Anglo-American Production Council

The names were announced last week of the American members of the Anglo-American Joint Production Council. The chairman of the American side is Mr. Philip D. Reed, chairman of the Board of the General Electric Co. It is expected that the Council will hold its first meeting during the week commencing 25th October.

N.W. Division Headquarters

The Manchester Town Planning Committee has approved plans for a three-storey extension, estimated to cost £50,000, to British Electricity House, Didsbury, the headquarters of the North Western Division of the British Electricity Authority. On behalf of residents of neighbouring houses, Councillor W. White has raised objection to the building of three-storey premises in a residential area where houses are limited to two storeys.

Waste Heat Utilization

Subject to approval by the Ministry of Fuel and Power, the Coventry Gas Committee has agreed to recommend the acceptance of a tender of £69,650 for the installation of plant at Foleshill gas works to generate electricity from waste heat. In a report on the matter, the gas engineer, Mr. J. E. Wakeford, said the proposal was to utilize waste heat from the retort settings, in conjunction with a gas turbine, for the generation of electricity by a new process. The Ministry of Fuel and Power had been particularly impressed by the scheme submitted by the

contractors, having regard to the fact that the plant would be economically sound, would have a productive capacity of 600 kW, and would effect an annual saving of coal of approximately 3,300 tons. The scheme would operate on one-third of the waste heat produced at the gas undertaking. If, at some future date, it were extended to cover the whole of the undertaking's waste heat, there would be an equivalent annual saving of 10,000 tons of coal. Applied throughout the gas industry, the scheme would enable electricity to be generated equivalent to a coal consumption of a million tons a year.

Quick Work

An example of speedy export service has reached us from the Nevelin Electric Co., Ltd., Croydon (an associated company of Lancashire Dynamo & Crypto, Ltd.). A rectifier equipment for the Odeon Super Theatre, Toronto, was received in Toronto with one of the bulbs broken in transit. The theatre was due to open in four days, and following a transatlantic telephone call, the whole resources of the Nevelin Co., were directed to the manufacture and dispatch of a new bulb. The work was carried out and the bulb was flown to Toronto, arriving in time for an installation test to be carried out before a special pre-view which commenced at the scheduled time.

Flameproof Apparatus

Publication of the quarterly lists of electrical equipment, mining and industrial, for which certificates of flameproof enclosure had been granted was discontinued in February last. In response to many requests the Testing Branch, Ministry of Fuel and Power, Health, Safety and Training Division, announces that it is to reissue the schedules quarterly, but in an abridged form, at the price of 1s. each, excluding postage. The first list, covering nine months to June 30th, is now available from the Librarian, Ministry of Fuel and Power, 7, Millbank, London, S.W.1.

Revised Lighting Specification

The second revision of BS.398, which is concerned with the symmetrical distribution of light from lamp fittings, permits better comparison and more precise classification; first, by dividing the light flux between the upper and lower hemispheres and, secondly, by the spacing/height ratio required for sensibly uniform illumination. A standard form of installation is defined for testing purposes. The document is obtainable for 2s. 6d. post free from the British Standards Institution, 24, Victoria Street, London, S.W.1.

New Zealand Agency Inquiry

The United Kingdom Senior Trade Commissioner at Wellington reports that he has been approached by the Fairey Electrical & Engineering Co., Ltd., McDonald Buildings, 45, Anzac Avenue, Auckland, C.I., which wishes to represent a United Kingdom concern manufacturing generating sets, operated by petrol engines, and ranging in size from 350 W to 35 kW. The company is interested particularly in the smaller sizes up to 5 kW. Generating sets have previously been imported from the United States but owing to the dollar shortage further licences for importation from that country are being refused. The equipment required must be built up as an integral unit and provided with fully automatic line transfer control. Interested manufacturers are requested to communicate direct with the Auckland firm, and any action taken on this matter should be reported to the Export Promotion Department, Thames House North, Millbank, London, S.W.1 (Ref. 39875/48/Com./846).

Assisting Export Trade

The British Export Trade Advertising Corporation, Ltd., which has recently been reappointed to place the overseas advertising for the British Industries Fair, 1949, has issued a brochure giving details of the work it has carried out and the service which it has available to the advertising agencies of Great Britain and to exporters.

Jerusalem "Espionage" Trial

The trial in Jerusalem of the two employees of the Jerusalem Electric Corporation (Messrs. Sylvester and Hawkins) was adjourned last week when one of the judges collapsed and afterwards died. The charges against the two men relate to the "collecting of information calculated to be of use to the enemy" and the operation of an unlicensed radio transmitter.

Wembley Civic and Industrial Exhibition

The Wembley Civic, Industrial and Commercial Exhibition will be opened by the Mayor of Wembley at the Civic Hall, Exhibition Grounds, Wembley, on 13th October. The exhibits will include heavy and light machinery, electric and machine tools, refrigeration and space heating equipment, electrical, radio and television appliances. Among the fifty-five exhibitors will be the following:—Eastern Electricity Board; Johnson Matthey & Co., Ltd.; Desoutter Bros., Ltd.; British Oxygen Co., Ltd.; Service Electric Co., Ltd.; General Electric Co., Ltd.; M.M.J. Radio & Television, Ltd.; and Hoover, Ltd.

Improved Railway Lighting

Improvements in the lighting of railway yards and depots to be carried out during the next two years by the Eastern Region of British Railways include the substitution of electric lighting for the gas installation at the big freight wagon marshalling yard at Guide Bridge, near Manchester. When completed in about eighteen

months time this will greatly facilitate the sorting of wagons in this important yard during the night hours, which are often the busiest. Other schemes include improvements to the lighting and power installations at the freight wagon repair depot at Dukinfield, the Copley Hill locomotive depot, the carriage sidings at Leeds and the former locomotive depot at Neepsend, near Sheffield, which is being converted into a wagon repair depot.

A change-over from gas lighting to electricity at Bidston locomotive depot and traffic sidings, near Birkenhead, is now almost complete.

G.E.C. Telephone Contracts

Telecommunications orders recently booked by the General Electric Co., Ltd., include a contract for a 5,000-line automatic telephone exchange to be supplied to Singapore. This will supplement an exchange supplied in 1930 for 6,600 lines, increased in 1939 to 9,000 lines and now to be expanded to 9,700. The total number of subscribers served by the two exchanges will be 13,700.

The Electricity Commission of Victoria, Australia, has placed an order with the company for power-line carrier-telephone equipment to provide a direct communication system over the Commission's 66-kV network, thus enabling the head office in Melbourne to exercise complete control of the whole network. Six telegraph channels on each speech circuit provide facilities for remote telemetering. It is estimated that the new communication system will cost £A.76,000.

Recent Introductions

We regret that in our " Recent Introductions " section last week the blocks illustrating the Standard Telephones portable battery charger and the Exide lightweight aircraft battery were transposed.

Traders and National Boards

The National Chamber of Trade is holding a conference at Scarborough from 25th to 29th September. One matter which will be discussed is a resolution from the Eastern Counties Area Council asking the Board of Management to approach the Federation of British Industries, the National Union of Manufacturers and the " National Electrical Manufacturers' Association " with a view to securing that their members shall not supply to the nationalized gas and electricity undertakings any consumer goods normally marketed through the private trader.

New Philco Company

The Philco Corporation of Philadelphia, Pa , U.S.A., has recently formed a wholly-owned British subsidiary known as Philco (Overseas), Ltd., for the purpose of selling in all export markets, British-made Philco products. The directors are Mr. William Balderson, president of the Philco Corporation, U.S.A., Mr. J. C. Beevor, and Mr. R. W. Cotton (managing director). Mr. Cotton was chairman and managing director of British Rola, Ltd., until 1945 and formerly managing director of the Philco Radio & Television Corporation of Great Britain, Ltd.

Illumination Design Courses

The Lighting Service Bureau has organized Illumination Design Courses which will be held at the Technical School, Kilmarnock, on Tuesday evenings from 28th September to 19th October, and at Oughton's Restaurant, Dumfries, on 7th to 14th October (evenings).

Trade Publications

Brook Motors, Ltd., Empress Works, Huddersfield.—Brochure illustrating the use of motors in the wool and worsted industries.

Associated Technical Manufacturers, Ltd., New Islington, Manchester, 4.—Priced catalogue of flexible cords, cable, screened leads and insulated sleeving.

Birlec, Ltd., Tyburn Road, Erdington, Birmingham, 24.—Technical brochure describing induction melting equipment including the Birlec-Northrup high-frequency furnace.

Trade Announcements

As from 1st October the **British Thomson-Houston Co., Ltd.,** will be directly represented in South Africa by its own subsidiary company, the British Thomson-Houston Co. (South Africa) (Pty), Ltd., Bedolu House, Corner Main and Troye Streets, Johannesburg. Wilson & Hard, Ltd., of Johannesburg, are relinquishing their agency but will complete all existing orders and contracts placed with them for B.T.H. products up to 30th September.

N.V. Electrical & Musical Instruments, Ltd., Birmingham, announces that Henderson Agencies, Ltd., Old Angus House, Oswald Street, Glasgow, have been appointed sole distributors in Scotland for N.V. fluorescent fittings and Carillon electric door chimes.

Macrome, Ltd., has appointed Progress Machinery, Ltd., 4, Lower Kevin Street, Dublin, as its agents in Eire.

Victor H. Iddon, Ltd., announce reduced prices for several products in their " Nettle " range of electrical accessories.

Change of Name

Ferrous Light Castings, Ltd., has changed its name to Ferrous Castings, Ltd.

South African Contract

The South African Electricity Supply Commission has placed a £1,000,000 contract with Hubert Davies & Co., Ltd., Johannesburg. It involves the construction of two single-circuit overhead 132-kV lines each 130 miles in length. The lines will connect the Commission's two main power stations in Natal at Colenso and Congella and will also tie into the proposed

new power station at Pinetown. The form of construction adopted by the Commission consists of 70-ft high galvanized steel towers carrying steel-cored aluminium conductor in spans of the order of 1,000 ft. It is expected that the work will take about three years to complete.

Dissolution of Partnership

Messrs. F. W. Muggeridge, M. Kirby and S. Hodgson, carrying on business as electrical and radio engineers at 46, Church Street, Shildon, Co. Durham, under the style of the H.M.K. Electrical & Radio, have dissolved partnership. Messrs. F. W. Muggeridge and M. Kirby will attend to debts and carry on the business.

Contract Price Adjustment Formulæ

The latest figures for use in connection with the B.E.A.M.A. contract price adjustment formulæ are as follows:—Rate of pay for adult male labour, 11th September: 110s. (unchanged). Board of Trade index figure for intermediate products, 11th September, 249·6, being the figure for August (against 250·5 for July).

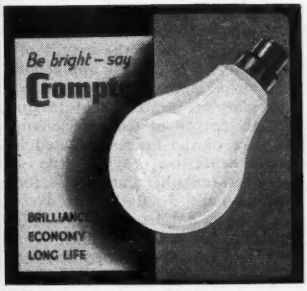
Lamp Publicity

THE main feature of this season's lamp publicity of the Edison Swan Electric Co., Ltd., is a window display centrepiece for "Royal Ediswan" lamps. This is a set piece, 5 ft 10 in. in length by 2 ft 8 in. high, in wrought iron finished ivory. This centrepiece includes a showcard in a frame secured to the ironwork of an attractive Florentine design. The scroll is in aluminium with the Royal coat of arms in full colours. The centrepiece is completed with small photographic illustrations of good lighting practice.

A new showcard which the company is issuing, shows an attractive lady extracting an "Ediswan" lamp from a carton. It is designed in ten colours and is 17½ in. by 25½ in. and is fitted with an invisible hanger.

The plans of Crompton Parkinson, Ltd., for the coming season include national and provincial Press advertising both for Crompton and "Kye" lamps. In addition, an extensive trade press scheme for Crompton lamps and lighting units will be carried out.

New display material includes a large Crompton lamp window cut-out measuring 32 in. by 29 in. by 6 in. when erected, printed in seven colours and in two planes. A small Crompton lamp cut-out suitable for counters as well as windows, measuring 13 in. by 14 in. by 5 in. when erected, printed in six colours, is also available. This latter item is novel in that the lamp, which is on a separate plane, is recessed in a half circle black back piece, and the whole is erected in one single movement. For "Kye" lamps a cut-out measuring 9 in. by 4½ in. can be had. This also is in two planes and is printed in five colours.



Above: "Kye" and Crompton lamp cut-outs. Left: New "Ediswan" window display centrepiece

Special window dressings to support and harmonize with the new display material will be available to retailers specially requiring them.

Small attractive Crompton lamp price lists will be issued to the trade for distribution to the buying public, and a much more comprehensive price list of from twelve to sixteen pages will be sent to stockists.

British Association

CONCLUSION OF BRIGHTON MEETING

THE fundamental concepts underlying various statistical methods used in engineering were discussed jointly by Sections G (Engineering) and A (Mathematics) at the Brighton meeting of the British Association for the Advancement of Science. The subject was introduced by Dr. B. P. Dudding and Mr. W. J. Jennett (G.E.C. Research Laboratories) who observed that notwithstanding the wartime stimulus and marked encouragement by Government Departments subsequent to 1942, factories using formal statistical methods whether in manufacture or research were still exceptional.

Acceptance inspection of products was frequently the most suitable method of introducing the industrialist to statistical techniques, because it was traditional practice to inspect the product after fabrication to determine whether it was acceptable. The paper gave examples of acceptance sampling, rectifying inspection schemes, quality performance of processes, quality characteristic processes, quality control charts for " defectives " and for measurements.

While operators were not called upon in any way to understand the details of control chart technique, they quickly appreciated its objective and experience had repeatedly shown that considerable improvement in quality resulted, not by reason of technical changes, but solely because of the interest created in tasks which might otherwise provide little satisfaction to the operator other than that associated with the pay packet. Similarly, the executive management need not be familiar with the details of chart technique, but must comprehend the principles which governed its operation.

The use of statistical technique alone could not solve problems demanding a knowledge of physics, chemistry and engineering, but it could serve as a powerful aid when drawing conclusions from technical data. Finally, a warning was sounded against any inclination to believe that acquisition of the technique discussed could result from listening to papers on the subject or reading text books.

Comments were made by other speakers on the application of statistics to the iron and steel industry and to machine shops.

The President, bring the discussion to a close, said that in the application of statistics to engineering problems, it was essential for the engineer and the mathematician to understand each other's point of view. This raised the whole question of clarity of expression. While the engineer must explain to the mathematician the factors that were really pertinent and why they were pertinent, the mathematician must explain to the engineer why certain conclusions had been arrived at. The engineer had to bear the responsibility for any action taken and it was therefore very important that he should have confidence in acting on what the statistician recommended.

Industrial Instrumentation

In a symposium in Section A (Mathematics and Physics), Sir Ewart Smith (Imperial Chemical Industries) reviewed the main stages in the chronological development of industrial instrumentation and considered means for expediting future progress. There was need for the codification and indexing of existing knowledge and a greater measure of uniformity of technical units in scientific nomenclature and in methods of presentation. Standardization of common components and of the leading dimensions of instruments would help in the design and the efficient production of instruments in addition to assisting the user.

Mr. S. S. Carlisle (head of the Instrument Section, British Iron and Steel Research Association) said that their industry was at present carrying out an extensive programme of modernization and development and was thus needing industrial measurement and control. In introducing instruments there was an understandable tendency to adopt those utilizing methods which were firmly established and of proved reliability and suitability of design to the particularly rigorous conditions under which they had to operate. Although they were keenly interested in the new science of electronics, they called for reasonable assurance that these requirements would be met before embarking on a large-scale use of electronic equipment in their works. As yet that confidence had not been inspired. There was need for a clearer presentation of the basic principles of operation of electronic equipment to those responsible for the operation of manufacturing processes.

More than a score of volumes of tables has been produced by the Mathematical Tables Committee since it commenced work in 1871. The presentation of the final report of the Committee (Prof. A. J. Thomson, chairman, and Dr. J. C. P. Miller, secretary) does not mean that computation of this kind is to cease, but that the Committee has been transferred from the the British Association to the Royal Society, thus making it eligible for financial grants in aid of its work.

Next year's meeting of the British Association is to be at Newcastle-upon-Tyne and that of 1950 will be in Birmingham.

Electricity from Natural Steam — A new volcanological observatory built at Rotorua, by the New Zealand Department of Scientific and Industrial Research is to study the generation of electricity from natural steam.

Swiss Electrical Exports

BIG ADVANCE IN 1947

THE Swiss electrical export trade made another big advance in 1947 after quite a marked recovery between 1945 and 1946. The following table shows the values of the principal increases, except some of the heavier unspecified apparatus, and that the Swiss electrical manufacturers serve a wide range of markets. During the same period there were increases in

Principal Markets	1947 Fr. (000)	Inc. or dec. on 1946 Fr. (000)
Accumulators	1,077	+ 391
To Argentina	322	+ 213
„ *Belgium*	142	+ 86
„ *Spain*	11	− 49
„ *Portugal*	75	− 20
„ *Holland*	114	+ 100
Insulators	743	+ 390
To Czechoslovakia	117	+ 43
„ *Holland*	72	− 55
„ *France*	10	− 9
„ *Italy*	56	+ 35
„ *Spain*	27	− 21
„ *Portugal*	9	− 11
„ *Norway*	175	+ 175
„ *Belgium*	101	+ 91
Meters and measuring instruments	18,784	+ 4,709
To Belgium	1,706	− 1,454
„ *Spain*	369	− 572
„ *Sweden*	2,774	+ 1,169
„ *Czechoslovakia*	1,270	+ 157
„ *Argentina*	1,929	− 66
„ *Holland*	2,618	+ 1,031
„ *Italy*	1,229	+ 83
Telegraph and telephone apparatus	5,495	+ 4,160
To Italy	300	+ 170
„ *Spain*	83	− 118
„ *Belgium*	453	+ 325
„ *Holland*	3,077	+ 2,995
„ *Brazil*	202	+ 110
„ *Turkey*	152	+ 90
Radio apparatus	9,179	+ 2,170
To Mexico	33	− 542
„ *Belgium*	764	− 463
„ *Sweden*	645	− 14
„ *Czechoslovakia*	1,157	+ 385
„ *South Africa*	703	− 319
„ *Brazil*	955	+ 332
„ *India*	304	+ 211
„ *France*	610	+ 245
„ *Spain*	502	+ 150
„ *Yugoslavia*	1,261	+ 1,261
Dynamo-electric machines	48,500	+ 5,312
To France	5,594	+ 1,672
„ *Spain*	4,606	− 8,135
„ *Portugal*	1,875	− 1,225
„ *Denmark*	811	+ 316
„ *Sweden*	3,180	+ 2,730
„ *Belgium*	4,023	+ 984
„ *Holland*	4,288	− 931
„ *Argentina*	1,728	+ 98
„ *Brazil*	3,404	+ 725
„ *Peru*	606	+ 5
„ *Egypt*	696	− 451
„ *China*	689	− 640
„ *India*	611	− 102

Principal Markets	1947 Fr. (000)	Inc. or dec. on 1946 Fr. (000)
Insulated wire and cable	2,178	+ 1,308
To Denmark	241	+ 106
„ *Sweden*	460	+ 286
„ *Belgium*	345	+ 193
„ *Czechoslovakia*	226	+ 138
Electric incandescent lamps	1,397	+ 783
To Italy	126	+ 102
„ *Sweden*	202	+ 176
„ *United States*	459	+ 229
Glass rectifiers with or without mercury	14	− 5
Unspecified elec. apparatus over 500 kg	4,604	− 482
To Sweden	610	+ 563
„ *Spain*	1,280	+ 512
„ *Portugal*	129	− 491
„ *France*	224	− 68
„ *Brazil*	220	− 241
„ *Belgium*	292	+ 22
Ditto 50 to 500 kg	6,812	+ 1,601
To Belgium	490	− 57
„ *Holland*	1,060	+ 547
„ *Spain*	607	− 192
„ *France*	478	+ 345
„ *Sweden*	893	+ 295
„ *Brazil*	476	− 139
„ *Chile*	310	+ 305
Ditto 3 to 50 kg	9,384	+ 3,092
To France	804	+ 2
„ *Belgium*	968	+ 245
„ *Holland*	1,468	+ 699
„ *Spain*	380	− 199
„ *Sweden*	614	+ 327
Ditto under 3 kg	9,632	+ 2,417
To France	1,124	+ 100
„ *Czechoslovakia*	426	+ 207
„ *Sweden*	2,652	+ 1,444
„ *Spain*	154	− 118
„ *Belgium*	1,746	+ 718
„ *Holland*	2,106	+ 885
Electric locomotives	1,149	+ 1,143
To France	604	+ 604
„ *Holland*	542	+ 542
Electrical apparatus for lighting, etc., of cycles	6,301	*
To Belgium	1,628	
„ *Holland*	1,012	
„ *Sweden*	438	
Ditto for other mechanical vehicles	8,231	*
To Czechoslovakia	5,014	
„ *France*	693	
„ *Holland*	507	

*Comparative figures not available; the total of the combined groups was double that of 1946.

groups last year with the leading customer countries and notes of increases and decreases compared with 1946. It will be noticed that practically every branch of the trade showed nearly all classes of electrical equipment imported into Switzerland except accumulators. Details of these will be given in a later issue. (17 Swiss francs = £1.)

FINANCIAL SECTION

Company News
Stock Exchange Activities

Reports and Dividends

Bylock Electric, Ltd.—Following the decision to pass the interim dividend the directors have issued a statement explaining the position and adding that they do not consider they will be able to recommend a final dividend for the year ended 31st July, 1948. Last year the interim of 100 per cent was followed by a final dividend of 200 per cent on the £15,000 ordinary capital. The statement records a substantial drop in sales during the half-year ended 31st July, attributable to variations in purchase tax and shortage of ready money in the hands of the public, while the uncertainty of the international political situation has tended to restrict export orders and has rendered the opening of new markets difficult. These trends made it necessary for the company to accelerate the development of new lines. Output was inevitably lost in changing over but these lines are now approaching full production and sales are steadily improving so that the directors are able to look to the future with cautious optimism.

A. C. Cossor, Ltd., have announced that consideration of the payment of the dividend on the 6 per cent preference shares in respect of the year ending 31st March, 1949, has been deferred until the accounts for the full year are available. The directors state that as a result of the reorganization mentioned at the annual meeting extensive economies have been made. It has been decided to transfer to Highbury sufficient of the work of Cossor Radar, Ltd., at Chadderton to utilize the available capacity of the main factory. In the last few weeks there has been some recovery in radio sales and the directors anticipate that the measures taken will yield an improvement in results during the second half of the year.

Newman & Watson, Ltd.—Record results both in output and net profit for the year ended 31st March last were reported by Mr. B. W. Mason (chairman) at the company's annual meeting last week. Net profit, at £38,731, was £23,621 greater than in the previous year. In view of the comments of excessive profits in the building industry he gave details showing how each £1 received by the company was spent, the increase in reserves and undistributed profits amounting to 2¾d. and net dividends to shareholders 1¼d. While there was work in view to keep the industry fully employed the Government's policy of restricting the building programme was having its effect and he did not anticipate that the past year's turnover would be maintained.

Hackbridge Cable Holdings, Ltd.—In connection with last week's offer for sale of 882,000 5s. ordinary shares at 15s. 6d., Philip Hill & Partners state that applications were received for 2,897,200 shares from 4,110 applicants. Applications for 220,000 shares from directors and associates of the company were accepted in full, leaving 662,000 to be allotted according to a proportionate scale.

Peter Brotherhood, Ltd., propose to pay a final dividend of 12 per cent, again making 20 per cent for the year.

John Thompson, Ltd., declaring an interim dividend of 7½ per cent against 5 per cent last year, emphasize that the increase is solely to reduce the disparity between interim and final payments.

A. Reyrolle & Co., Ltd., is paying an interim dividend of 5 per cent (unchanged).

The British Aluminium Co., Ltd., is again paying an interim ordinary dividend of 4 per cent, less tax.

New Companies

Philco (Overseas), Ltd.—Registered 8th September. Capital, £50,000. Importers, exporters and manufacturers of, and dealers in, electrical and other instruments and appliances, etc. Subscribers: B. Stuart-Fisher and S. Disborough. Solicitors: Slaughter & May, 18, Austin Friars, E.C.2.

Autolectric Control (Essex), Ltd.—Registered 11th September. Capital, £100. Manufacturers of, and dealers in, alarm control systems of all kinds, etc. Directors: J. Rose and R. A. Andrew. Regd. office: 485, London Road, Westcliff-on-Sea.

Low & High Pressure Insulations Co., Ltd.—Registered 3rd September. Capital, £1,000. Electrical engineers and contractors, etc. Directors: E. Palmer and Mrs. Norah Palmer. Regd. office: 318, Torquay Road, Paignton.

Increase of Capital

P. Ormiston & Sons, Ltd.—Increased by £3,000, in £1 10 per cent redeemable cumulative preference shares, beyond the registered capital of £5,000.

Liquidations

Richard Crittall (Industrial Plant & Equipment), Ltd.—Winding up voluntarily. Liquidator, Mr. W. Walker, of Peat, Marwick & Mitchell, Glasgow.

Richard Crittall Research & Development, Ltd., Dulrae Manufacturing Co., Ltd., Dulrae Patents, Ltd., & Heather Filters, Ltd.—Winding up voluntarily. Liquidator, Mr. R. W. West, of Wake, West, Price & Co., 6, Broad Street Place, London, E.C.2.

Kamba Electric, Ltd.—Winding up voluntarily. Liquidator, Mr. A. E. Attwood, Queen Street Chambers, 90, Queen Street, London, E.C.4, appointed 27th August.

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Your co-operation in this respect will enable us to concentrate on standard production with consequent reduction in despatch time.

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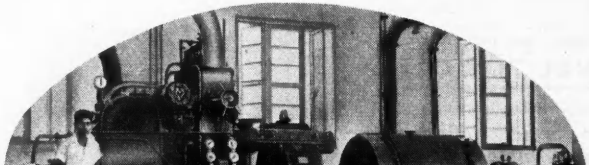
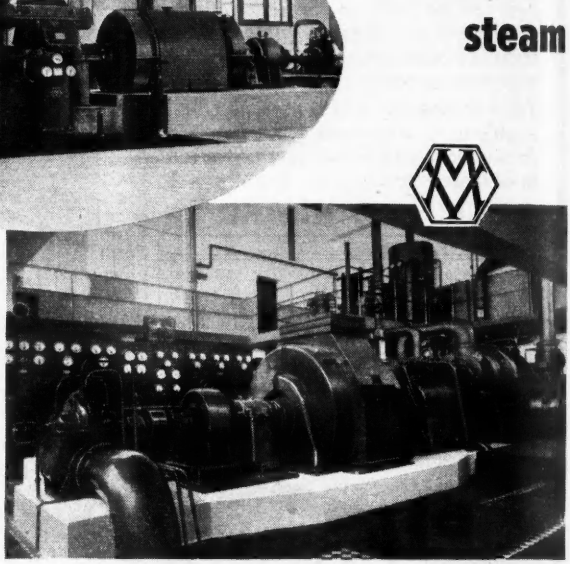
SELF-CONTAINED TURBINES

supplying pass-out steam



Above: *A Metrovick 2,200 kW self-contained turbo-generator supplying pass-out steam for processing at the Sirpur Paper Mills, Hyderabad, Deccan, India, who have on order three larger sets—two of 7,500 kW and one of 4,500 kW rating.*



Above: *A 3,000 kW self-contained M-V turbo-generator at the Sung Sing cotton mills, Pao-Ki, China.*

The advantages of Metrovick self-contained turbines can be summarised as follows:—

- **Low initial cost of plant, foundations and buildings.**
- **Robust design, high efficiency and absence of auxiliary motors and control gear.**
- **Mechanical drive of pumps gives independence of outside sources of power for starting.**
- **The pass-out type of self-contained turbine combines these advantages with maximum fuel economy in combined power and heat installations.**

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STOCKS and SHARES

LITTLE alteration occurs from day to day in the general condition of Stock Exchange business. This week's statement by Mr. Bevin on foreign policy was awaited with a certain degree of nervous interest, and, pending the announcement, markets were in a very subdued state. Gilt-edged stocks held their prices fairly well. Electricity "threes" hardened to 100⅛, a gain of 5s. on the week; Transport "threes" at 99¼ showed a gain of 3s. 9d. per cent. British Electric Traction deferred is the outstanding feature amongst price movements on the week. After its jump of 220 points, a further rise of 120 took the price to 1945, equivalent to £19 9s. for a £1 share.

Hackbridge Cables

Notable success attended last week's public offer of 882,000 Hackbridge Cable Holdings 5s. ordinary at 15s. 6d. Heavily oversubscribed, the lists remained open for only a minute; dealings began this week, at a premium of 3d. per share. This issue places slightly less than half the ordinary capital in public hands; the balance remains with Mr. C. W. Blomfield, the chairman and founder of the original firm. First accounts will cover about six months to March, 1949. On the assumption that profits for that period will continue at not less than last year's record level, the intention is to pay a dividend at the rate of 20 per cent per annum. This would afford a yield of £6 9s. per cent at the issue price of the shares, or £6 7s. per cent on their present quotation. The whole of the £450,000 5 per cent preference capital has been placed at 22s. 6d. per share, quoted now at 23s. 6d.

Price Changes

The serious character of the news from India served to depress Calcutta Electric and Calcutta Trams to 31s. 3d. and 31s. 6d., showing falls of 3s. 6d. and a florin respectively; the subsiding of the trouble failed to bring about any recovery. Anglo-American Telegraph deferred at 20¼ is 2½ down. Amongst industrials, Lancashire Dynamo at 5 1/16 and Chloride Electric at 96s. 3d. are both 1s. 3d. lower, while Tube Investments at 6 1/16 show ¼ fall. Cable and Wireless ordinary is 4¼ down at 198½; on the other hand, Globe Telegraph ordinary at 46s. 6d. are a shilling higher. Tillings at 5¾ are slightly better, after sharp fluctuations. Walsall Conduits strengthened to 55s. Vactric and Watford Manufacturing at 5s. 9d. are both 6d. better on balance.

Expropriation

With the example of the Victoria Falls & Transvaal Power in mind, inquiry is naturally directed to the question as to what rights of expropriation local authorities may have. The Uganda part of the East African Power & Lighting Co. is being taken over, but not the areas in Kenya and Tanganyika. It seems fair to assume that the company will remain undisturbed for some time to come. The present price of the shares compares with a highest of 48s. 6d. reached last year. The lowest over the past decade was 18s. 9d. in 1939. In May of this year, the company issued 800,000 4 per cent preference shares at 20s. 6d., half in the United Kingdom and half in Kenya. The price of the London issue is 23s. 6d.

Oldham & Son

An improvement from 9s. 9d. to 11s. ex dividend in the price of Oldham & Son 1s. shares over the past three weeks has done justice to the good figures accompanying the declaration of the final dividend, which again made a total of 60 per cent for the year. According to the preliminary figures, net profits, before tax, rose from £145,000 to £224,000. Although the tax provision is roughly doubled, there remains a decidedly conservative margin between earnings and dividend. The return on the shares works out at just under 5½ per cent. A yield of 6 per cent from another conservative dividend is shown by Parmiter, Hope & Sugden 1s. shares at 5s.; there has been a modest improvement in the price since the disclosure, a month ago, of an impressive expansion of profits during the year ended last March. The 30 per cent dividend came out of earnings equal to 115 per cent on the £53,710 ordinary capital.

Miscellaneous Matters

Bylock Electric 1s. ordinary relapsed from 11s. 3d. to 7s. 6d. on the passing of the interim dividend; at this time last year, the company paid 100 per cent, making it up later to 300 per cent for the full year. Pending some official account of the circumstances, shares changed hands down to 6s. 3d. British Thermostat's declaration of the usual 7½ per cent interim dividend recalls the last accounts, which showed that net profits doubled during 1947. Since, under dividend limitation, the payment for the year was restricted to an already conservative 23½ per cent, the yield of £4 11s. 3d. per cent on the 5s. shares at 25s. 9d. is very amply protected.

Four to Five Per Cent

At the common price of 61s. 6d., the market has on offer small blocks of Reyrolles and C. A. Parsons, both yielding £4 1s. 3d. per cent; Revo Electric 10s. shares paying nearly 4½ per cent, and Aberdare Cables £4 18s. per cent. Chloride Electric "B" shares can be bought at 98s. 9d., or a little cheaper, to pay a fraction more than 4 per cent; Crabtree 10s. shares at 42s. 6d. and Crompton Parkinson 5s. units at 27s. give 4 guineas each. Walsall Conduits 4s. shares at 55s. are ex the interim dividend, and, like Electric Constructions at 49s. 6d., return a trifle over 5 per cent.

Electricity Supply

Progress on New Stations. Manx Joint Authority Proposal.

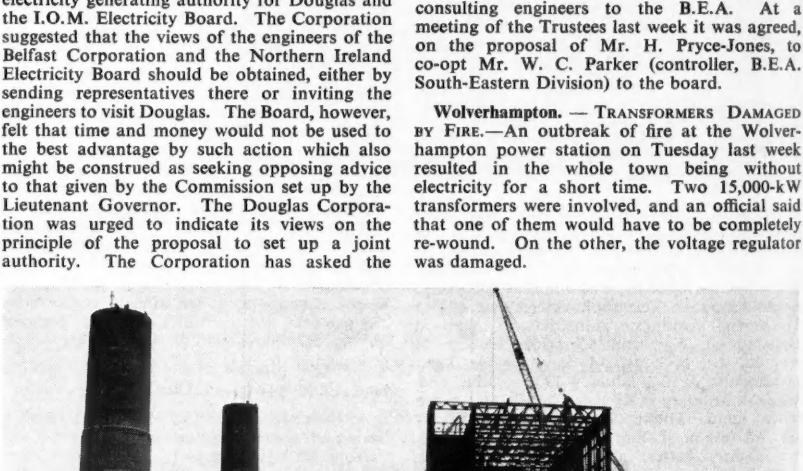
Burry Port.—POWER STATION CONSTRUCTION.—A progress report on the £15,000,000 Carmarthen Bay power station issued by the South Wales Division of the British Electricity Authority states that work already completed includes the construction of new roads and sidings, the demolition of derelict buildings, and the preparation of a large area for the reception of building material. Excavations for the turbine room basement have reached a considerable depth, drying conditions for this work being maintained by the installation of a new kind of de-watering plant. The area of excavations to be treated extends to 50,000 sq ft. A pump-house to be built on the adjoining foreshore will supply water for the condensing plant and a protective embankment, nearly 30 ft high and more than 700 ft long, is being constructed to enclose the pump-house in order that deep excavations can be carried out in safety.

Isle of Man.—PROPOSED JOINT GENERATING AUTHORITY.—Little progress has been made in connection with the proposal to form a joint electricity generating authority for Douglas and the I.O.M. Electricity Board. The Corporation suggested that the views of the engineers of the Belfast Corporation and the Northern Ireland Electricity Board should be obtained, either by sending representatives there or inviting the engineers to visit Douglas. The Board, however, felt that time and money would not be used to the best advantage by such action which also might be construed as seeking opposing advice to that given by the Commission set up by the Lieutenant Governor. The Douglas Corporation was urged to indicate its views on the principle of the proposal to set up a joint authority. The Corporation has asked the Lieutenant Governor whether he will arrange and preside over a conference between the Board and the Corporation Electricity Committee.

It is expected that the final report of the I.O.M. Hydro-Electric Commission will be laid before the Tynwald in October. The borough electrical engineer of Douglas (Mr. C. Anderson) has prepared a memorandum which has been sent to the Lieutenant Governor for information.

Shoreham. — HARBOUR IMPROVEMENTS. — Agreement having been reached between the Shoreham Harbour Trustees and the British Electricity Authority, plans for extensive improvements to the harbour in connection with the development of Southwick power station are to be sent to Rendel, Palmer & Tritton, consultants, for final advice. The works include a new lock 360 ft by 55 ft, deepening of the canal to make it navigable by 4,500-ton colliers, widening of the harbour entrance, extension of the West Pier and construction of a new eastern breakwater. The scheme was submitted by Sir William Halcrow & Partners, consulting engineers to the B.E.A. At a meeting of the Trustees last week it was agreed, on the proposal of Mr. H. Pryce-Jones, to co-opt Mr. W. C. Parker (controller, B.E.A. South-Eastern Division) to the board.

Wolverhampton. — TRANSFORMERS DAMAGED BY FIRE.—An outbreak of fire at the Wolverhampton power station on Tuesday last week resulted in the whole town being without electricity for a short time. Two 15,000-kW transformers were involved, and an official said that one of them would have to be completely re-wound. On the other, the voltage regulator was damaged.



A recent photograph showing the progress made in the erection of the new Croydon power station

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (1s. each) may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2.

1943

BRITISH THOMSON-HOUSTON Co., Ltd.—"Sealing-in machines for electric lamps and the like." 18586. 9th November, 1942. (607766.)

1944

British Thomson-Houston Co., Ltd.—"Fusible electric circuit interrupters." 7353. 23rd April, 1943. (607768.)

British Thomson-Houston Co., Ltd. (General Electric Co.).—"Dynamo-electric machine drives." 9242. 15th May, 1944. (607678.)

Marconi's Wireless Telegraph Co., Ltd.—"Electron-discharge devices." 12541. 30th June, 1943. (Cognate application 12542/44.) (607587.)

H. J. Dowkes.—"Means for amplifying electrically the sound of stringed musical instruments." 17784. 18th September, 1944. (607681.)

R. C. O. Wiig.—"Magnetic separators." 18515. 27th September, 1944. (607682.)

General Electric Co., Ltd., G. M. Tomplin, J. A. Goss and G. S. Winchcombe.—"Apparatus for detecting flaws in electrically conducting materials." 22817. 17th November, 1944. (607683.)

1945

Cinema-Television, Ltd., and R. B. Head.—"Luminescent screens for use in cathode-ray tubes and methods of making such screens." 1512. 18th January, 1945. (607684.)

Novobax, Ltd., and A. V. Sharman.—"Plaster-depth electric switches." 4004. 16th February, 1945. (607687.)

Marconi's Wireless Telegraph Co., Ltd.—"Electronic phase-splitting devices and frequency discriminators." 8115. 3rd April, 1944. (607771.)

Sperry Gyroscope Co., Inc.—"Thermionic valve circuits, and impulse generators therefor." 9770. 18th April, 1944. (607599.)

Dunlop Rubber Co., Ltd., and P. H. Amphlett.—"Process for heating compositions by high-frequency alternating electric currents." 12550. 18th May, 1945. (607690.)

Philco Radio & Television Corporation.—"Refrigerating machines and evaporators therefor." 13561. 30th May, 1944. (607691.)

A. C. Cossor, Ltd., and D. C. Phipps.—"Thermionic cathodes." 21034. 17th August, 1945. (607697.)

Standard Telephones & Cables, Ltd.—"Electrical control circuits for scanning operation in cathode-ray tubes, oscillographs or the like." 22404. 4th January, 1943. (607779.)

British Thomson-Houston Co., Ltd., and W. J. Pool.—"Control system for regulating a number of variable quantities, for example, the speeds of boiler auxiliaries." 23911. 17th September, 1945. (607605.)

R. E. Thompson & Co. (Sunbury), Ltd., and P. R. Benford.—"Thermostatic electric switches." 24815. 25th September, 1946. (607780.)

Gilbert & Barker Manufacturing Co.—"Apparatus for testing spark plugs, ignition, and other electric leads." 26441. 2nd December, 1944. (607782.)

J. Bohli.—"Rotors of magneto electric machines." 26714. 12th October, 1945. (607783.)

Western Electric Co., Inc.—"Multiplex pulse telephony." 26921. 19th October, 1944. (607610.)

Akt.-Ges. Brown, Boveri & Cie.—"Device for preventing the operation of differential relays when electrical inductive apparatus is switched-in." 28628. 28th October, 1944. (607613.)

Standard Telephones & Cables, Ltd.—"Electric signal transmission system." 28645. 18th June, 1943. (607711.)

Radio Apparat Co. Aktieselskabet H. Ebbesen & I. C. Jensen, and O. E. Grue.—"Mercury switches." 32460. 30th November, 1945. (Convention date not granted.) (607617.)

General Electric Co., Ltd., and E. S. Friedlander.—"Polarized electromagnetic torque producing devices, such, for example, as polarized relays." 33646. 12th December, 1945. (607793.)

English Electric Co., Ltd., and G. F. Tagg.—"Electrical measuring instruments, and the like." 33780. 13th December, 1945. (607618.)

1946

British Thomson-Houston Co., Ltd.—"Electric circuits containing reactors." 2106. 29th January, 1945. (607724.)

C.A.V., Ltd., and E. H. C. Thorpe.—"Electric push-button switches." 2344. 24th January, 1946. (607619.)

British Thomson-Houston Co., Ltd., and J. E. Stanworth.—"Glass compositions." 2719. 28th January, 1946. (607797.)

Marconi's Wireless Telegraph Co., Ltd., and F. C. Thompson.—"Navigation aiding radio systems." 3060. 30th January, 1946. (607620.)

E. A. Hinksman.—"Methods and devices for controlling electrically-operated vibratory or oscillatory apparatus." 3119. 31st January, 1946. (607621.)

Franco-British Electrical Co., Ltd., and A. H. Brackensey.—"Standard lamps." 3329. 1st February, 1946. (607407.)

British Thomson-Houston Co., Ltd.—"Alkylsilicone sols and gels." 3438. 10th February, 1945. (607426.) "Organo-silica sols and gels." 3439. 10th February, 1945. (607427.)

Westinghouse Electric International Co.—"Mercury vapour tubes." 3461. 1st March, 1945. (607431.)

Philco Radio & Television Corporation.—"Vacuum tube systems of the cathode follower type." 3493. 2nd February, 1945. (607434.)

L. T. Bird.—"Phase and frequency modulation systems." 3500. 4th February, 1946. (607435.)

L. G. Millbank and S. S. C. Mitchell.—"Electrical slip-ring assemblies." 3514. 4th February, 1946. (607438.)

P. Pelle.—"Thermionic valve oscillator circuits." 3523. 15th February, 1945. (607442.) "Thermionic valve relay circuits." 3524. 15th February, 1945. (607443.)

C. Kerr, N. H. Lucas, E. Lucas and H. T. Holder.—"Electric irons." 3557. 5th February, 1946. (Cognate application 18540/46.) (607450.)

Philips Lamps, Ltd.—"Piezo-electric devices and the manufacture thereof." 3572. 12th February, 1945. (607453.) "Frequency-control circuits." 3573. 8th February, 1945. (607798.)

Naamlooze Vennootschap Philips' Gloeilampenfabrieken.—"Arrangements for feeding webs wholly or in part of regenerated cellulose." 3582. 8th February, 1945. (607454.) "Arrangement for moving and guiding thin bands." 3587. 9th February, 1945. (607455.)

Renfrew Electric & Refrigerator Co., Ltd.—"Multi-position electric switches." 3605. 8th June, 1945. (607461.)

Kolster-Brandes, Ltd., and C. E. Lock.—"Screening cans for electrical apparatus." 3615. 5th February, 1946. (607465.)

British Thomson-Houston Co., Ltd.—"Bases for electric lamps." 3635. 12th February, 1945. (607471.)

S. Argyris.—"Electrically propelled bicycles." 3647. 5th February, 1946. (607476.)

Koray, Ltd., C. D. Moore and R. F. Ball.—"Electrical conductors and condensers." 3688. 6th February, 1946. (607486.)

Eureka Vacuum Cleaner Co.—"Thermostatic control mechanism." 3719. 7th February, 1945. (607633.)

Igranic Electric Co., Ltd.—"Lifting magnets." 3730. 10th February, 1945. (607637.)

British Thomson-Houston Co., Ltd.—"Methods of producing vinyl fluoride polymers." 3746. 13th February, 1945. (607499.) "Piezo-electric apparatus." 3747. 13th February, 1945. (607500.)

Smart & Brown (Engineers), Ltd., W. H. Spivey and B. Stevens.—"Electric snap-action switches." 3749. 6th February, 1946. (607501.)

H. F. Trewman and W. E. Lord.—"Production of electrical conductive patterns." 3824. 7th February, 1946. (607517.)

General Electric Co., Ltd., and A. E. Judson.—"Telephone subscribers' instruments." 3871. 7th February, 1946. (607528.)

Pirelli-General Cable Works, Ltd., and J. R. Harding.—"Erection of overhead electric cables." 3872. 7th February, 1946. (607529.)

W. Bleloch and A. Q. Harvey.—"Electric induction heaters." 3887. 4th June, 1945. (607530.)

British Thomson-Houston Co., Ltd.—"High-frequency wave guides." 3889. 14th February, 1945. (Addition to 586458.) (607531.)

A. Stockwell, Sir G. B. Lomas-Walker and J. Lloyd (legal representatives of W. B. Stockwell, deceased).—"Electric lamp fittings." 3923. 7th February, 1946. (607541.)

Standard Telephones & Cables, Ltd.—"Receivers for time-modulated signal pulses." 3985. 19th February, 1945. (607560.)

Trix, Ltd., and W. Altman.—"Electric relays or the like." 3991. 8th February, 1946. (607563.)

British Insulated Callender's Cables, Ltd., and J. H. Suker.—"Apparatus for heating materials by means of high-frequency electric currents." 4035. 8th February, 1946. (607572.)

Telefonaktiebolaget L. M. Ericsson.—"Metering devices for manual telephone systems." 4061. 12th February, 1945. (607580.)

J. T. Ratcliffe.—"Mechanism for winding and paying out cables and the like." 4067. 8th February, 1946. (607581.)

J. Walsh-Hunt.—"Electro-magnetic motors." 4072. 8th February, 1946. (607583.)

G. W. B. Electric Furnaces, Ltd., and J. McDonald.—"Domestic cookers." 4089. 9th February, 1946. (607643.)

Ericsson Telephones, Ltd., H. J. Moore, J. T. Bacon and J. C. Cooper.—"Means for fixing and forming electrical contacts." 4091. 9th February, 1946. (607644.)

W. T. Henley's Telegraph Works Co., Ltd., and E. Moor.—"Electrically heated smoothing irons." 4093. 9th February, 1946. (607645.)

F. Sigmund and W. S. Hlavin.—"Winding elements of electrical machines." 4097. 9th February, 1946. (607647.)

A. H. Bebb and J. Buckingham.—"Electrical insulated cables." 4129. 11th February, 1946. (607651.)

G. R. Heard.—"Electrically heated blankets, pads and the like." 4142. 11th February, 1946. (607656.)

Slater & Wheeler, Ltd., and W. E. H. Jones.—"Electric brazing." 4144. 11th February, 1946. (607658.)

Rotax, Ltd., and W. G. Bourne.—"Electro-magnetic switches." 4154. 11th February, 1946. (607660.)

Commercial Electric Co., Ltd., and G. S. Kloet.—"Electric fires." 4155. 11th February, 1946. (607661.)

General Electric Co., Ltd., and J. F. Pye.—"Means for indicating the failure of an electric supply." 4183. 11th February, 1946. (607738.)

British Thomson-Houston Co., Ltd.—"Lamp filament connections." 4219. 21st February, 1945. (607748.)

A. C. Cossor, Ltd., A. Le Boutillier and E. Danielsson.—"Control arrangements for electric motors." 4300. 12th February, 1946. (607807.)

S. G. Dehn (Metals & Controls Corporation).—"Electrical protective apparatus for energy translating devices." 4346. 12th February, 1946. (607813.)

A. C. Sampietro.—"Speed-responsive electrical apparatus." 4359. 12th February, 1946. (607819.)

Linde Air Products Co.—"Electric power control." 4361. 31st March, 1945. (607821.)

Western Electric Co., Inc.—"Electric pulse signal repeaters." 4388. 15th February, 1945. (607829.)

E. K. Cole, Ltd., and F. G. A. Haegele.—"Manufacture of vitreous stems for tubular electric lamps." 4433. 13th February, 1946. (607843.)

Naamlooze Vennootschap Fabriek van Electrische Apparaten Voorheen F. Hazemeijer & Co.—"Electrical resistance apparatus." 5333. 23rd October, 1944. (607667.)

Naamlooze Vennootschap Philips' Gloeilampenfabrieken.—"Devices for magnetically determining the thickness of non-magnetic or poorly magnetic material." 5577. 7th June, 1941. (607760.)

Standard Telephones & Cables, Ltd., R. M. Barnard, J. H. Fearon and E. L. Bodycombe.—"Electrical condensers." 6784. 5th March, 1946. (607846.)

W. G. Curwain.—"Electric connectors." 10072. 1st April, 1946. (Cognate application 15804/46.) (607850.)

Amended Specifications

554,827. British Thomson-Houston Co., Ltd., and another.—"Heteropolar inductor alternators."

579,435. Ferranti, Ltd., and another.—"Electric discharge devices."

586,556 and 594,206. Metropolitan-Vickers Electrical Co., Ltd., and another.—"Internal combustion turbine plant for propulsion."

Trade Marks

RECENT applications for the registration of trade marks include the following, objections against which may be entered within a month from 15th September:—

LATIL. No. 660,668. Class 7. Electric generating plant, and motors and engines (other than of land vehicles), and component parts included in Class 7 of all such goods; and agricultural implements of the larger kind.—Latil Industrial Vehicles, Ltd., 7, Fitzroy Square, W.1.

Circle design with Bylock superimposed on map of British Isles; to be used only for goods manufactured within the British Isles. No. 662,293. Class 7. Domestic mixing machines and electric hedge cutters.—Bylock Electric, Ltd., 109, South Street, Ponders End, Mdx.

ULTRA. No. 655,969. Class 9. Wireless telegraphic, telephonic and television transmitting, receiving and amplifying apparatus; electric and electronic control apparatus included in Class 9; radar apparatus; electrically operated testing and calibrating apparatus; speed indicating, governing and recording apparatus included in Class 9; and condensers, resistances, magnets, gramophone pick-ups, sound amplifiers and cut-outs, and parts included in Class 9.—Ultra Electric, Ltd., Ultra Works, Western Avenue, Acton, W.3.

CARTEC. No. 661,992. Class 9. Electrical anti-theft appliances for motor vehicles.—Alverstone Products, Ltd., 104, Great Russell Street, London, W.C.1.

ZEDA. No. B658,271. Class 9. Electrical apparatus and instruments included in Class 9, but not electric flexible conductors, wire, cables or electric irons or any goods of the same description.—Z Electric Lamp and Supplies Co., Ltd., Zeda House, 21, Newman Street, Oxford Street, London, W.1.

ROTODYNE. No. 663,849. Class 9. Electrically operated rotary regulators for controlling the power input to electric furnaces.—Electric Furnace Co., Ltd., Netherby, 161, Queen's Road, Weybridge.

AIRMEC. No. 658,529. Class 10. Electrically operated apparatus and instruments for surgical, medical, dental and veterinary purposes. Also No. 658,530. Class 11. Electrical installations and apparatus for heating and cooking.—Airmec, Ltd., Wadsworth Road, Perivale, Mdx.

MANINSULEC. No. 663,916. Class 17. Electrical insulating tape and electrical insulating compounds.—Manchester Insulating & Insulating & Electrical Co., Ltd., 8, Fairfield Street, Manchester.

CONTRACT INFORMATION

ACCEPTED TENDERS AND PROSPECTIVE ELECTRICAL WORK

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.

Ashton-under-Lyne.—4th October. Housing Committee. Electric wiring in 32 houses. (See this issue.)

Edinburgh.—29th October. North of Scotland Hydro-Electric Board. Complete electrical installations at Sloy power station and dam and other sites in the Loch Sloy project, covering lighting, heating, clocks, power, lightning protection, indications, etc. (See this issue.)

Egypt.—CAIRO.—7th December. Ministry of Public Works. Electric pumping plant and transformer station at Atf pumping station. (39937/48. Com./737.)*

North Riding.—1st October. County Council. Alterations and additions to lighting installation at the County Hall. (See this issue.)

New Zealand.—WELLINGTON.—State Hydro-Electric Department.—Five 50-kV, 500-MVA three-phase circuit-breakers and accessories. (Contract No. 97, closing date 7th December); and 1,000-MVA, 22-kV switchgear of the duplicate busbar indoor metalclad drawout type and accessories (Contract No. 98, closing date 14th December). (E.P.D. 40710/48. Com./853.)*

Portugal.—25th November. Lisbon Harbour Board. Twelve electric portal travelling cranes (from 3,000 to 10,000 kg loads) (40657/48. Com./829.)*

South Africa.—PRETORIA. — 28th October. Department of Posts and Telegraphs. Compressors. (40448/48. Com./821.)* Aluminium alloy arms for telephone poles. (Ref. 40248/48.)*

City Electricity Department. 22nd November. Supply of 33-kV insulated cables. (40245/48. Com./835.)*

Sheffield.—9th October. City Transport Department. Frequency-modulated v.h.f. radio equipment (one fixed and four mobile stations). (See this issue.)

Uruguay.—MONTEVIDEO.—Usinas Electricas y Telefonos del Estado. 21st October. Supply of 2·8 million metres of bare copper cable and other material for overhead h.v. lines. (40309/48. Com./802.)*

* Specifications may be inspected at the Export Promotion Department, Thames House North, Millbank, S.W.1.

Orders Placed

Ashington.—Urban District Council. Electrical installations in 60 houses in North Seaton Road.—J. & A. Oliver.

Boldon (Durham).—Urban District Council. Accepted. Electrical installations in 26 houses. —J. Calvert, Seaham.

Bournemouth.—Corporation. Accepted. Installation of electric lighting at the Malmesbury Park Infants' and Junior School at a cost of £721, plus additional cable charges of £25—Electrical Supplies, Ltd.

Chester-le-Street.—Rural District Council. Accepted. Electrical installations in 60 houses on the Barley Mow site and 20 houses in Plawsworth Road, Sacriston.—B. L. Oliver, Birtley.

Lowestoft.—Corporation. Recommended. Electrical services to 50 Orlit houses being erected on the No. 1 housing estate, Yarmouth Road (£1,023).—Gort & Sons.

North Riding.—County Council. Accepted. Electrical installation in connection with additions to Throxenby Hall Children's Home. —F. Shepherd & Son, Scarborough.

Sunderland.—Education Committee. Accepted. Electrical installation at kitchen dining rooms at Barnes County Primary School (£500). —Drake & Gorham.

York.—Corporation. Recommended. New lighting installation in the south gallery of the Art Galleries (£111).—North Eastern Electricity Board.

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Ardwick.—Additions to works, 182, Stockport Road, for R. R. Stockfis (Manchester), Ltd; W. Telford Gunson, architect, 10, Marsden Street, Manchester, 2.

Astley Bridge. — Houses (27), Kermoor Avenue, Farnborough Road and Stonyhurst Avenue; F. & H. Douglas, builders, Blackburn Road.

Bangor.—Extensions to secondary school for Caernarvonshire E.C.; W. Lloyd Jones, county architect, Caernarvon.

Berwick.—Rebuilding of Eyemouth grain mill; Purdie Lumsden & Co., Ltd., builders, 25, Oxford Street, Newcastle-on-Tyne.

Blackburn.—Factory, Whitebirk Drive; H. Breakell & Co., Ltd., Pitt Street.

Boldon Colliery.—Houses (40) for Boldon U.D.C.; Gordon Durham, Ltd., Boldon Lane, East Boldon, near Sunderland.

Brighton.—Farm buildings, including dairy block, High Park Farm, Stanmer estate; D. J. Howe, borough engineer, King's Road.

Camborne-Redruth.—Permanent houses (56), Pengegon estate; U.D.C. surveyor, West End, Redruth.

Cambridge.—Infants' and junior schools,

Newmarket Road; borough surveyor, The Guildhall.

Carlisle.—Additions to Cumberland Infirmary; V. Waddington, architect, Beckermet, Cumberland.

Coventry.—Fire stations on sites at Fletchamstead Highway and Lythall's Lane; D. E. E. Gibson, city architect, 1a, Warwick Row.

Doncaster.—"Traditional" houses (92), Clay Lane; estates surveyor, 15, South Parade.

Dronfield.—County college; county architect, County Offices, St. Mary's Gate, Derby.

East Ham.—Secondary schools, Langdon Crescent (£377,000); borough engineer

Edinburgh.—Houses (20) at Davidson's Mains (£24,280), for St. Andrew's Housing Association; secretary.

Guildford.—Two residential blocks at St. Luke's Hospital; South West Regional Hospital Board, 11a, Portland Place, London, W.1.

Harrow.—Dwellings (56), Weald Lane and Long Elmes; U.D.C. surveyor, Council Offices, Uxbridge Road, Stanmore.

Hebburn-on-Tyne.—Extensions to works of Wailes, Dove Bitumastic Co., Ltd. (£50,000); Brims & Co., Pandon Buildings, City Road, Newcastle-on-Tyne.

Lancaster.—Houses (60); R.D.C. surveyor, 5, Dalton Square.

Leeds.—Flats (200) for aged persons, various estates; city architect, Priestley House, Quarry Hill.

Macclesfield.—Community centre, shops and parish hall, Ivy Road estate; E. A. Heppenstall, borough architect, Pear Tree House, Jordangate.

Manchester. — Warehouse, Great Marlborough Street, for W. Kayley; G. E. Green, architect, 1b, Marsden Street.

Additions to works, 12, Raby Street and Sewerby Street, Moss Side; Sorensen Bakery Equipment, Ltd., Drake Street, Hulme.

Morpeth.—Houses (800) at Broomhill; J. Coates, R.D.C. surveyor, Dacre Street.

Newcastle-on-Tyne.—Installation of fluorescent lighting in the matloom shop, sewing room and workshops for the blind in Whickham View; city estate and property surveyor, Town Hall.

North Riding.—Alterations to Throxenby Hall Children's Homes (£9,000); county architect, Northallerton.

Oldham.—Extensions to factory, Highfield Street, for Oldham Flax Fibre Co.; G. B. Howcroft, architect, Priory Buildings, 77, Union Street.

Ormskirk.—Houses (50), County Road; E. J. Wright, U.D.C. surveyor, Burscough Street.

Poole.—Factory extensions, Newtown, for Chatwyn Lamps; H. N. Hibbs, architect, Alton Chambers, Parkstone.

Shoreham-by-Sea.—Permanent houses (40), Stoney Lane, Kingston-by-Sea; U.D.C. surveyor, 31, John Street.

Sidcup.—Health centre, St. Paul's Cray, for Kent C.C.; county architect, Maidstone.

South Westmorland.—Houses (50), Milnthorpe, Kirkby Lonsdale, etc., for R.D.C.; E. Middleton, architect, 1, Queen Street, Lancaster.

Stoke Newington.—Blocks 30, 31, 32 and 49 of dwellings at Woodberry Down Estate, for L.C.C.; Tersons, Ltd., E.C.1.

Stourbridge.—Houses (157), Norton estate; G. N. Maynard, borough engineer, The Council House.

Stretford.—Civic restaurant, Lostock (£6,500); A. H. Perry, borough engineer, Town Hall, Talbot Road.

Sunderland. — Houses (76) for the T.C.; Sunderland and District Building Trade Employers' Federation.

Dock improvements for the River Wear Commissioners (£684,000); Sir William Halcrow & Partners, engineers, Lyon's House, Caxton Street, London, S.W.1.

Sutton Coldfield.—Secondary modern school; C. H. Elkins, county architect, Warwick.

Woodley (Berks.).—County primary school, Sutcliffe Avenue estate; county architect, 35, Bath Road, Reading.

Workington.—Commercial garage, Pilgrim Street, for J. R. Graham; Oldfield, Simpson & Saul, architects, National Provincial Bank Buildings.

American Research

TWO unusually interesting scientific developments are recorded in the September issue of the American journal, *Electrical Engineering*. One of them is a camera for the study of phenomena of ultra short duration, which is named after its inventor Dr. A. M. Zarem, a United States Navy scientist. The shutter of this camera operates so fast that light moves a distance of only 10 ft during the time of one exposure. This high shutter speed is obtained by means of an electro-optical Kerr cell : a glass tube filled with nitrobenzine in which a pair of electrodes is immersed. The cell is placed between two polarizing filters crossed so that no light can be transmitted. When a high voltage is applied to the electrodes of the Kerr cell, the state of the polarized light is immediately altered, allowing the light image of the subject being photographed to pass through the camera lens to the film. By controlling the timing of the voltage, photographic records have been obtained with an effective exposure time of $0{\cdot}01 \times 10^{-6}$ second.

The other device is a tiny steel rotor, developed by Prof. J. W. Beams, of Virginia University, which rotates at 633,000 revolutions per second and will produce a centrifugal force 430 million times greater than gravity. The rotor is suspended magnetically in a vacuum and revolved by means of a rotating magnetic field, the maximum speed being limited only by the strength of the rotor material.